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(12) **United States Patent**
Jolly

(10) **Patent No.: US 10,397,322 B2**
(45) **Date of Patent: Aug. 27, 2019**

(54) **MOBILE AND COMPUTER APPLICATIONS, SYSTEMS AND METHODS FOR LARGE GROUP TRAVEL AND EVENT MANAGEMENT**

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(72) Inventor: **Sunmeet Singh Jolly**, San Jose, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **16/197,355**

(22) Filed: **Nov. 21, 2018**

(65) **Prior Publication Data**

US 2019/0158587 A1 May 23, 2019

Related U.S. Application Data

(60) Provisional application No. 62/589,149, filed on Nov. 21, 2017.

(51) **Int. Cl.**

H04W 4/50	(2018.01)
H04L 29/08	(2006.01)
H04W 4/20	(2018.01)
G06F 8/61	(2018.01)

(52) **U.S. Cl.**

CPC ***H04L 67/1095*** (2013.01); ***H04L 67/1097*** (2013.01); ***H04L 67/26*** (2013.01); ***H04W 4/20*** (2013.01); ***H04W 4/50*** (2018.02); *G06F 8/61* (2013.01)

(58) **Field of Classification Search**

CPC .. H04W 4/50; H04L 67/1095; H04L 67/1097; H04L 67/00; H04L 67/10

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2007/0192168	A1*	8/2007	Van Luchene	G06Q 10/047 705/14.54
2014/0282016	A1*	9/2014	Hosier, Jr.	H04W 4/08 715/733
2014/0295822	A1*	10/2014	Koo	G06Q 20/3278 455/420

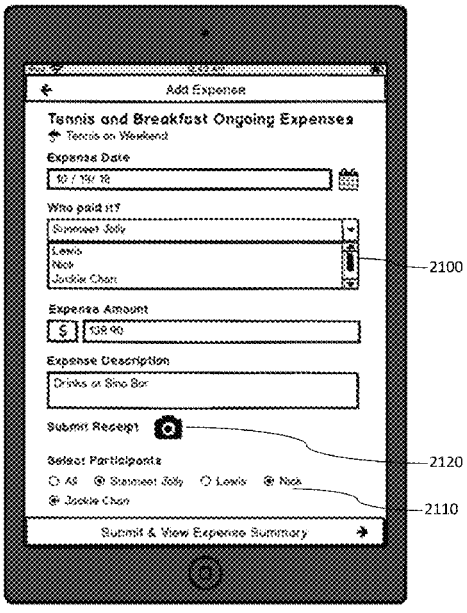
* cited by examiner

Primary Examiner — Said M Elnoubi

(57) **ABSTRACT**

Systems and Methods that help in Group travel and Event management, initially embodied as GROTU mobile app built for iOS and Android platforms. GROTU uses computer networking, internet cloud and mobile smartphone's camera, computing power, storage and graphical user interface abilities to help users in creating travel surveys from pre-built, customizable template for voting on group choices; organizing photos and external storage hyperlinks in photo albums stored in cloud; group expenditure management using smartphone camera for photo receipts uploading while calculating, storing and helping in settlement of group expenses; sending event invitations via SMS, Email and Push Notifications including potluck items management; and providing users with organized chatting ability to have private discussions while planning group events and trips. GROTU eliminates the need for linking spreadsheets and online forms on chat apps for planning and managing group travel and events.

7 Claims, 23 Drawing Sheets



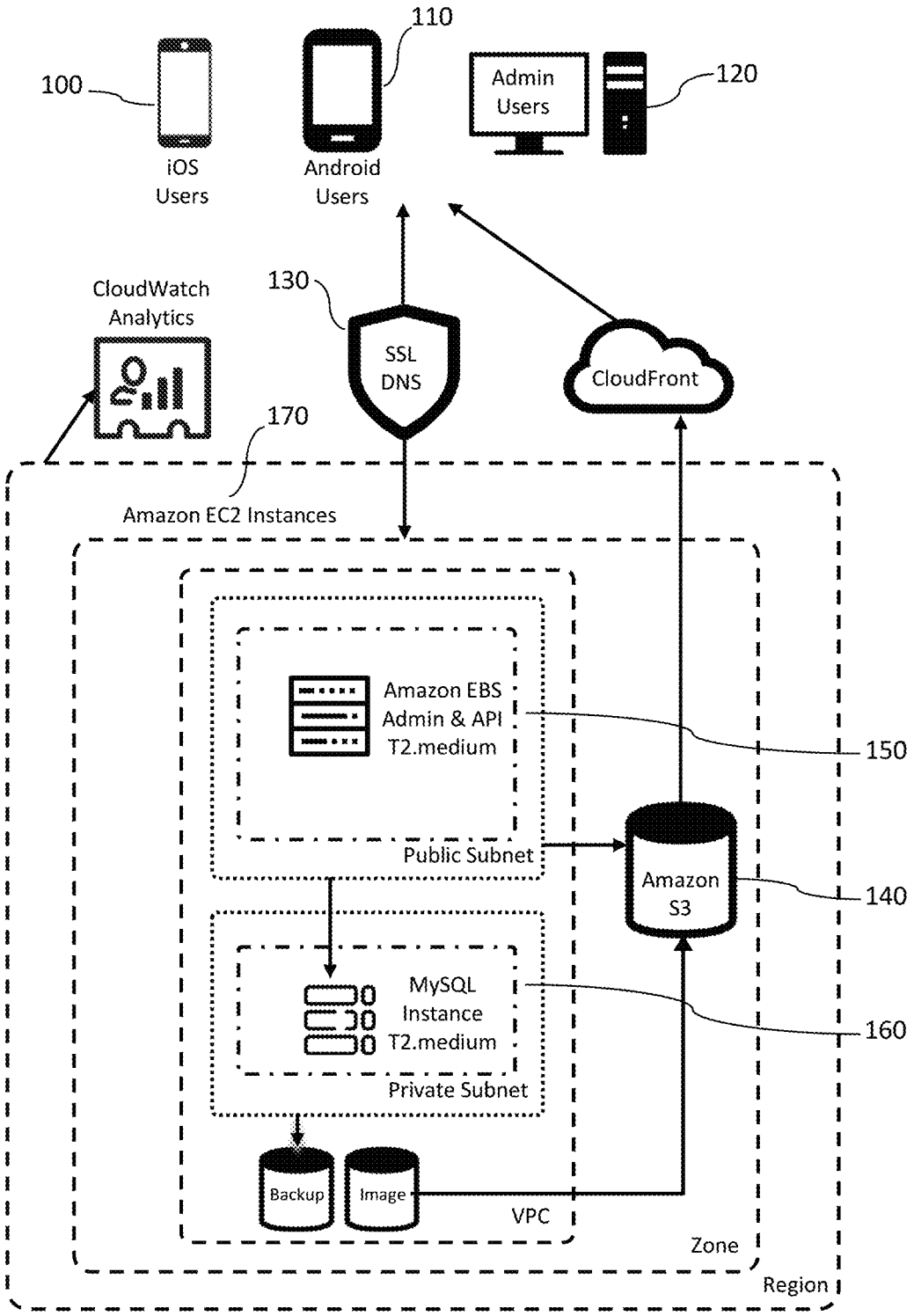

100
iOS Users
110
Android Users
Admin Users
120
CloudWatch Analytics
130
SSL DNS
CloudFront
170
Amazon EC2 Instances
Amazon EBS Admin & API T2.medium
150
Public Subnet
Amazon S3
140
MySQL Instance T2.medium
160
Private Subnet
Backup
Image
VPC
Zone
Region

Fig. 1

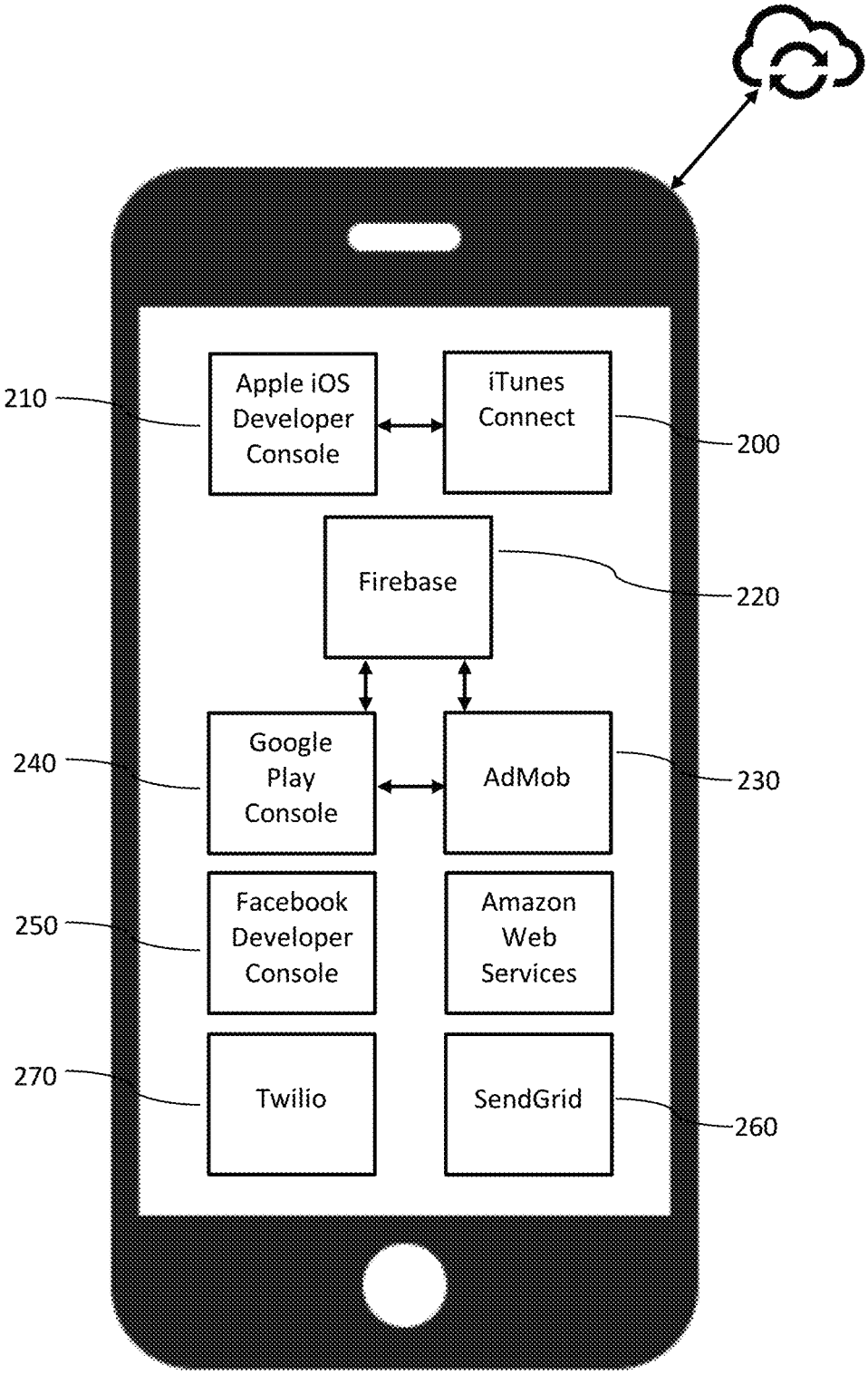

Apple iOS Developer Console
iTunes Connect
Firebase
Google Play Console
AdMob
Facebook Developer Console
Amazon Web Services
Twilio
SendGrid
210
200
220
240
230
250
270
260

Fig. 2

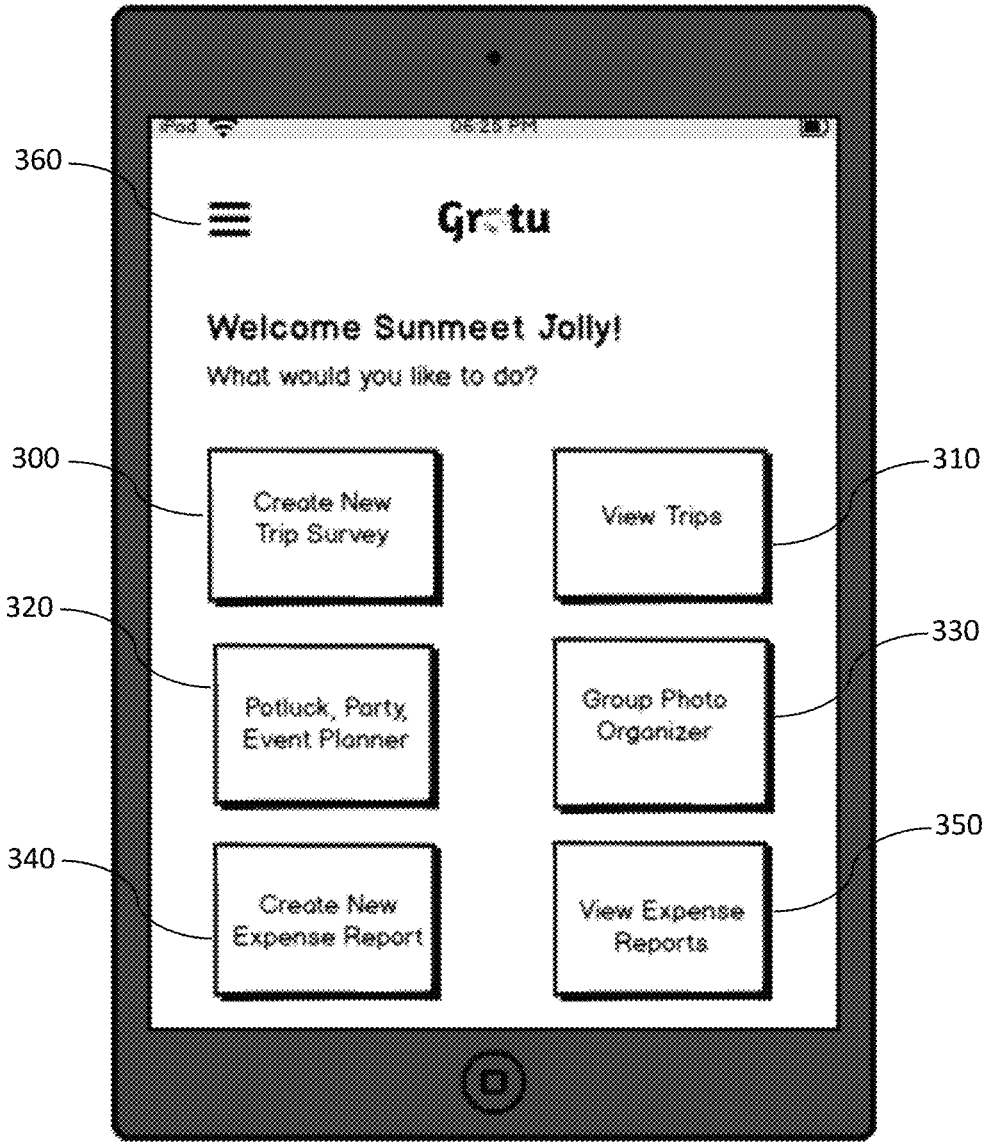

360
Gr tu
Welcome Sunmeet Jolly!
What would you like to do?
300
Create New Trip Survey
310
View Trips
320
Potluck, Party, Event Planner
330
Group Photo Organizer
340
Create New Expense Report
350
View Expense Reports

Fig. 3

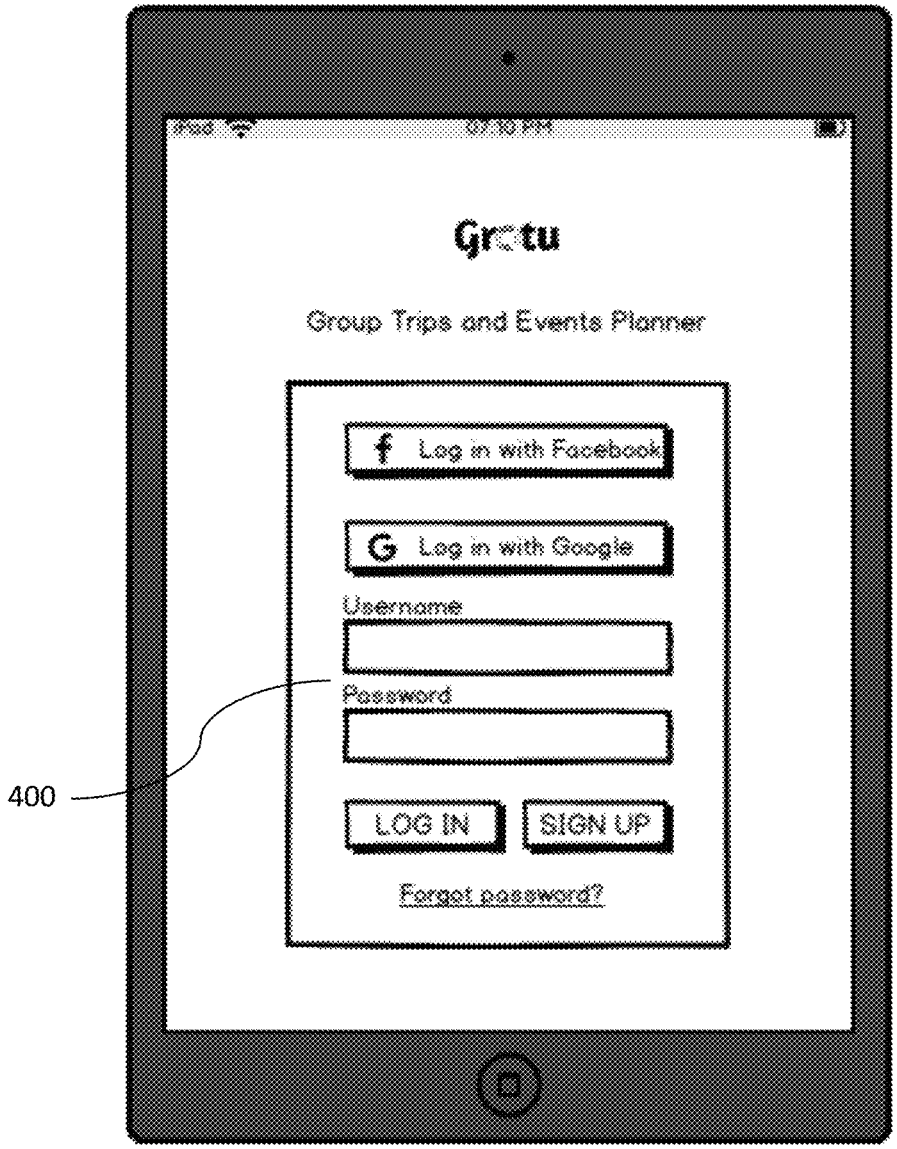

Gr tu
Group Trips and Events Planner
Log in with Facebook
Log in with Google
Username
Password
LOG IN
SIGN UP
Forgot password?
400

Fig. 4

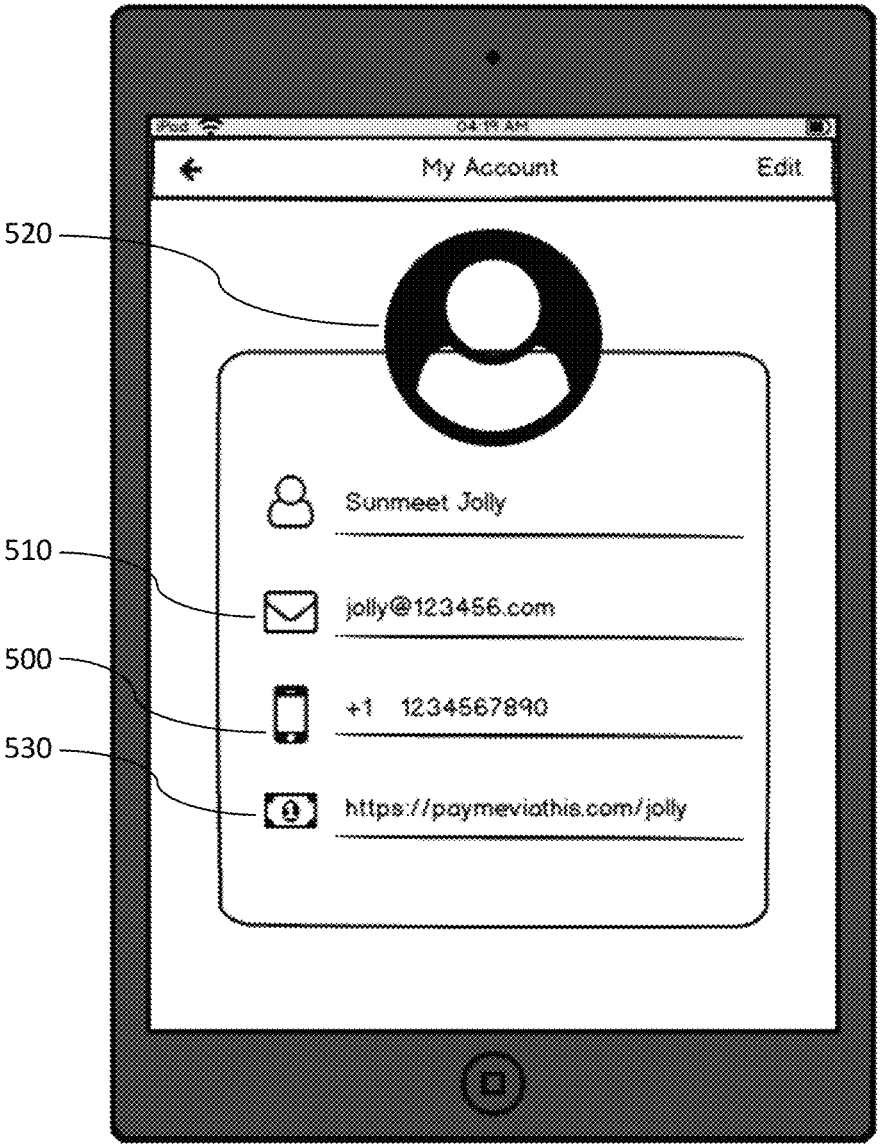

520
510
500
530
My Account
Edit
Sunmeet Jolly
jolly@123456.com
+1 1234567890
https://paymeviathis.com/jolly

Fig. 5

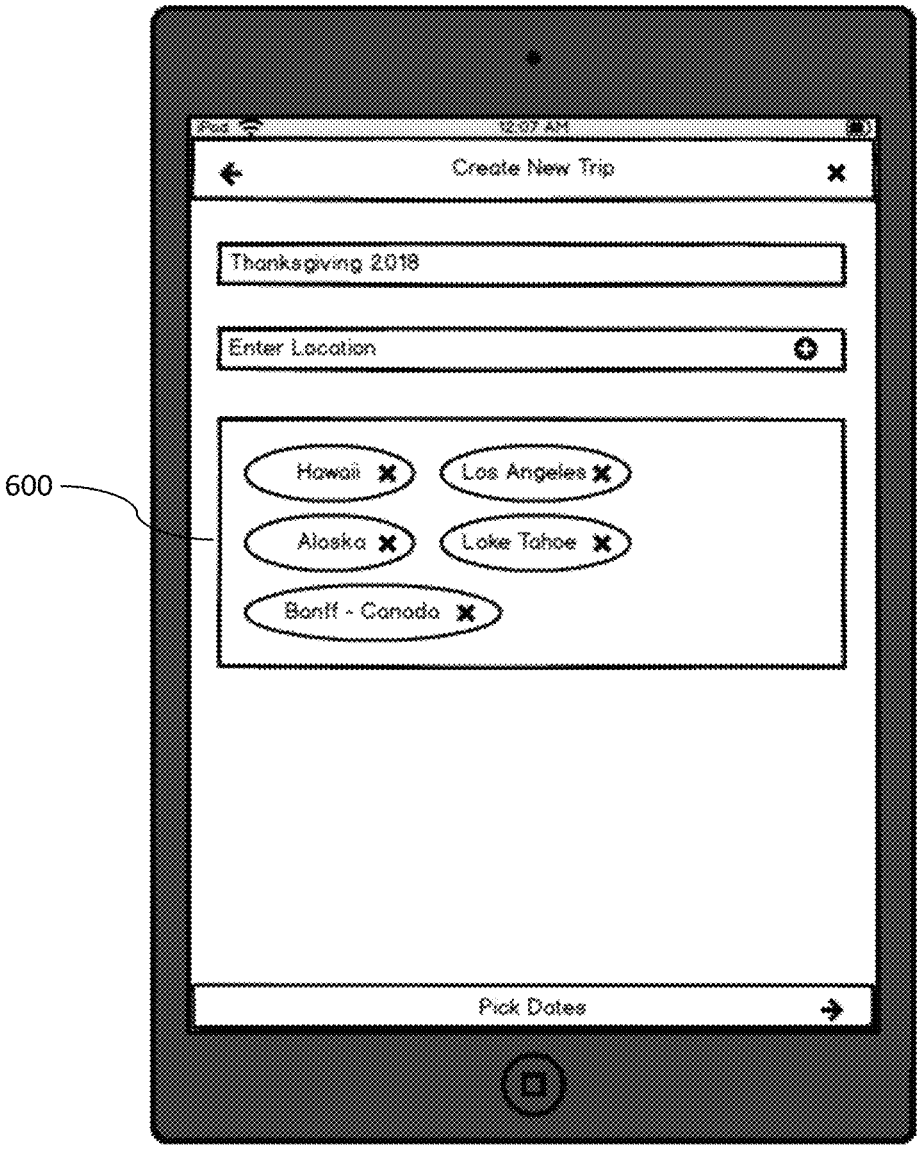

600
Create New Trip
Thanksgiving 2018
Enter Location
Hawaii
Los Angeles
Alaska
Lake Tahoe
Banff - Canada
Pick Dates

Fig. 6

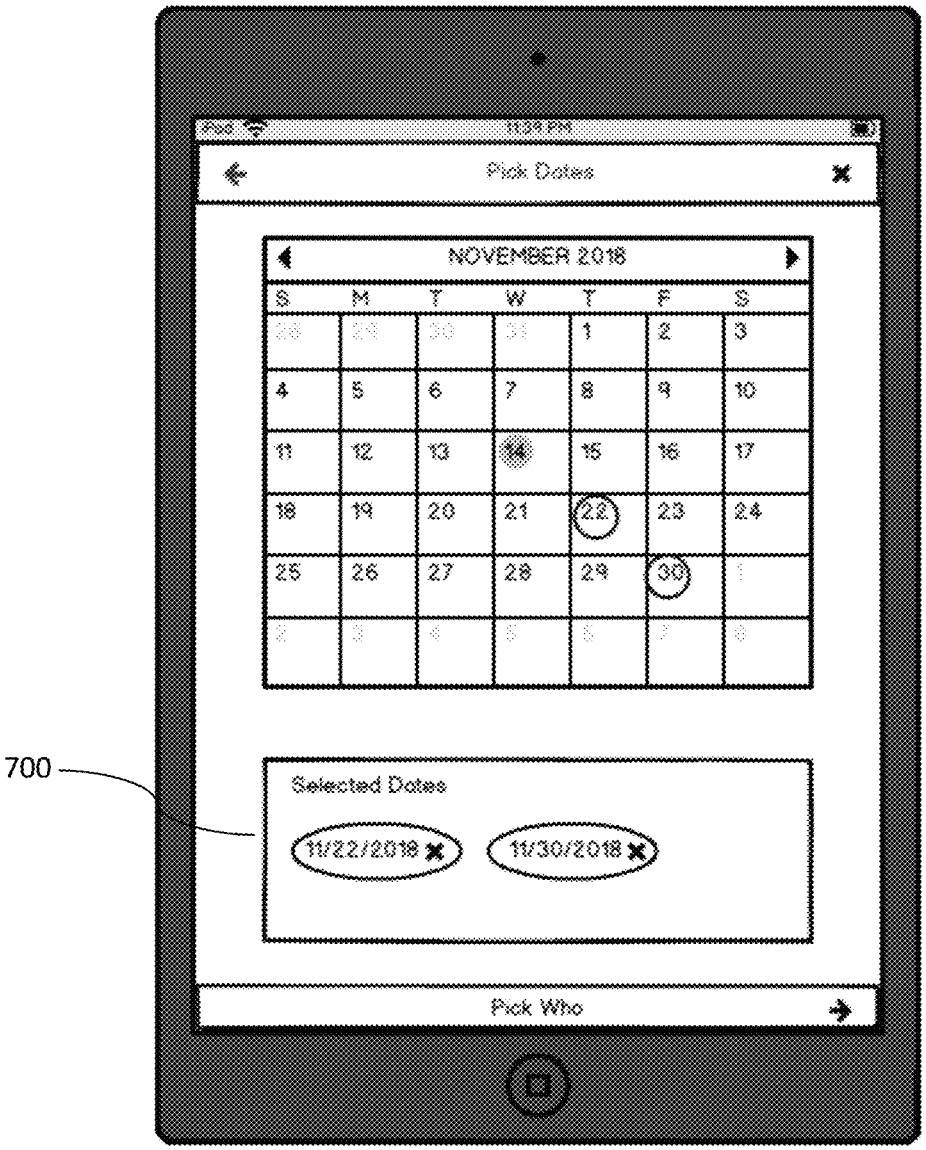

700
Pick Dates
NOVEMBER 2018
S M T W T F S
1 2 3
4 5 6 7 8 9 10
11 12 13 14 15 16 17
18 19 20 21 22 23 24
25 26 27 28 29 30
Selected Dates
11/22/2018
11/30/2018
Pick Who

Fig. 7

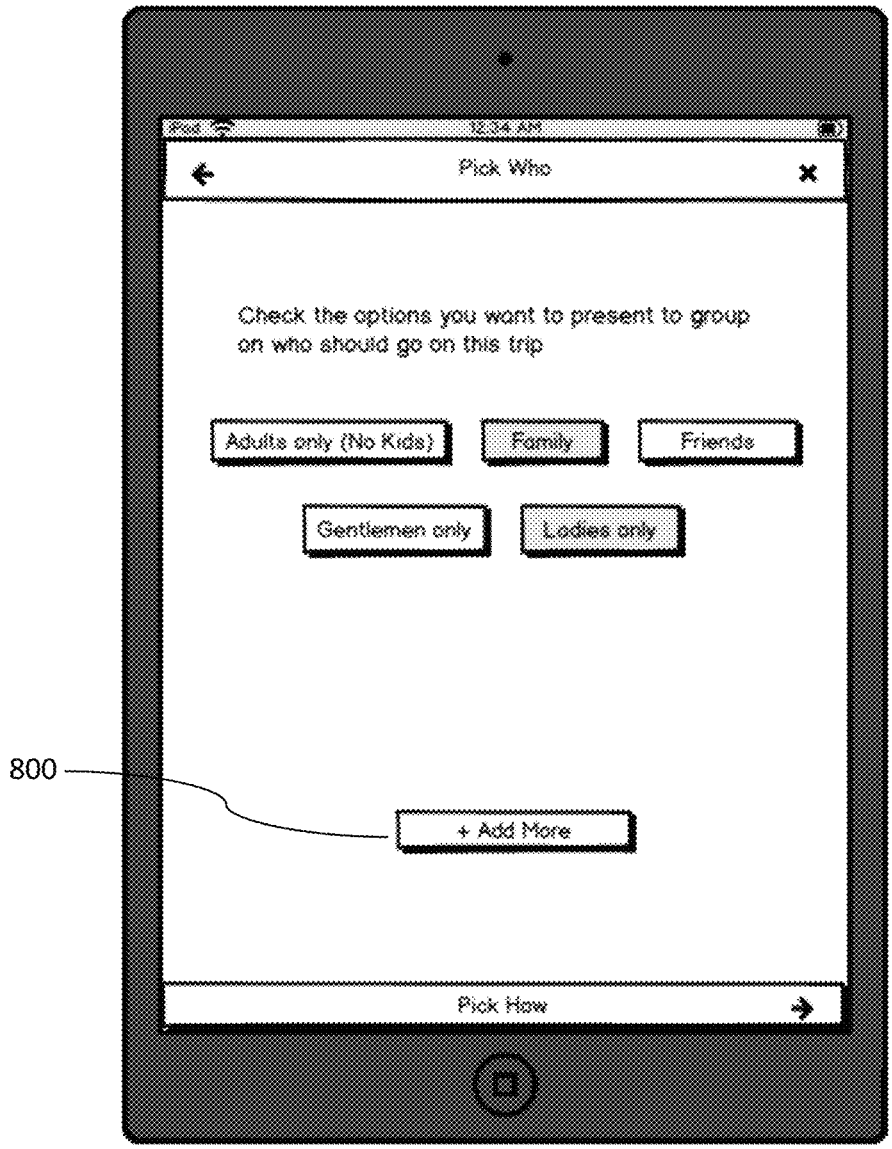

Pick Who
Check the options you want to present to group on who should go on this trip
Adults only (No Kids)
Family
Friends
Gentlemen only
Ladies only
800
+ Add More
Pick How

Fig. 8

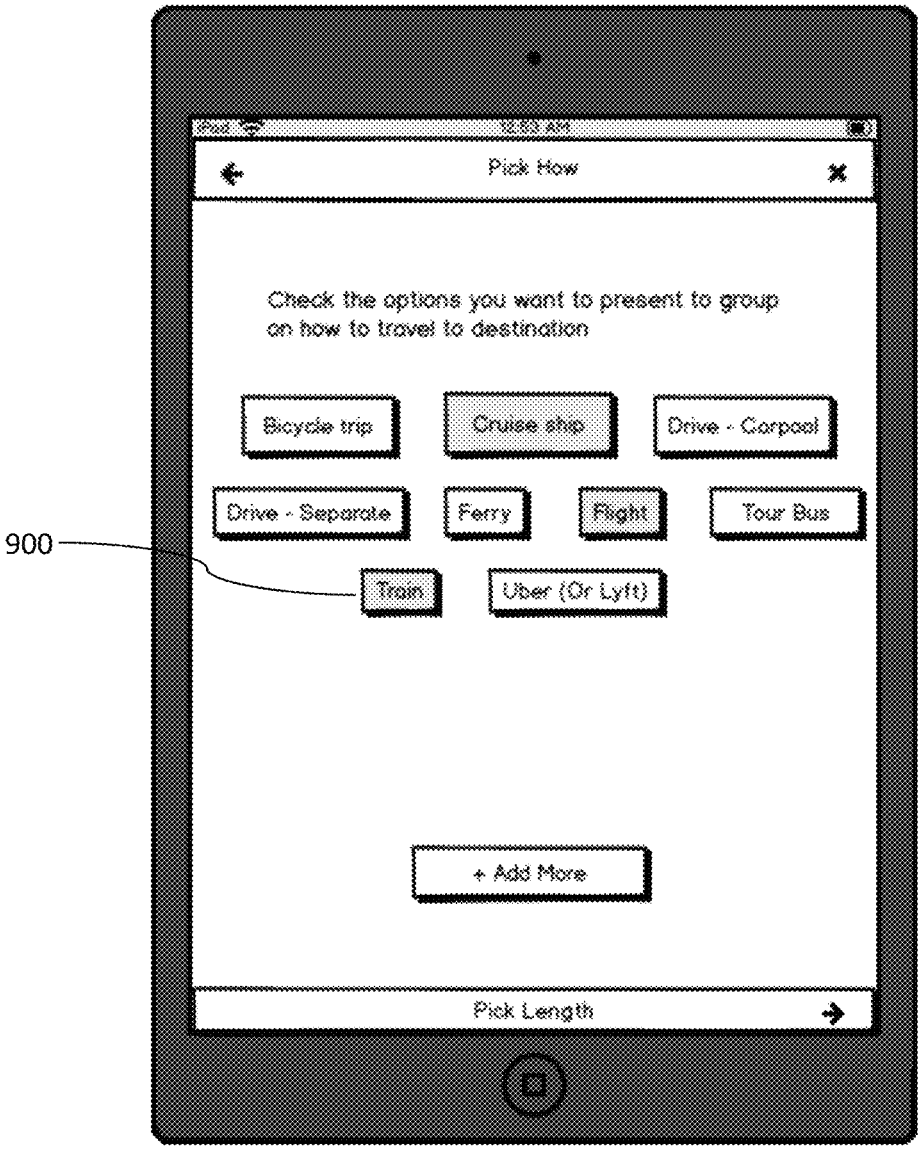

900
Pick How
Check the options you want to present to group on how to travel to destination
Bicycle trip
Cruise ship
Drive - Carpool
Drive - Separate
Ferry
Flight
Tour Bus
Train
Uber (Or Lyft)
+ Add More
Pick Length

Fig. 9

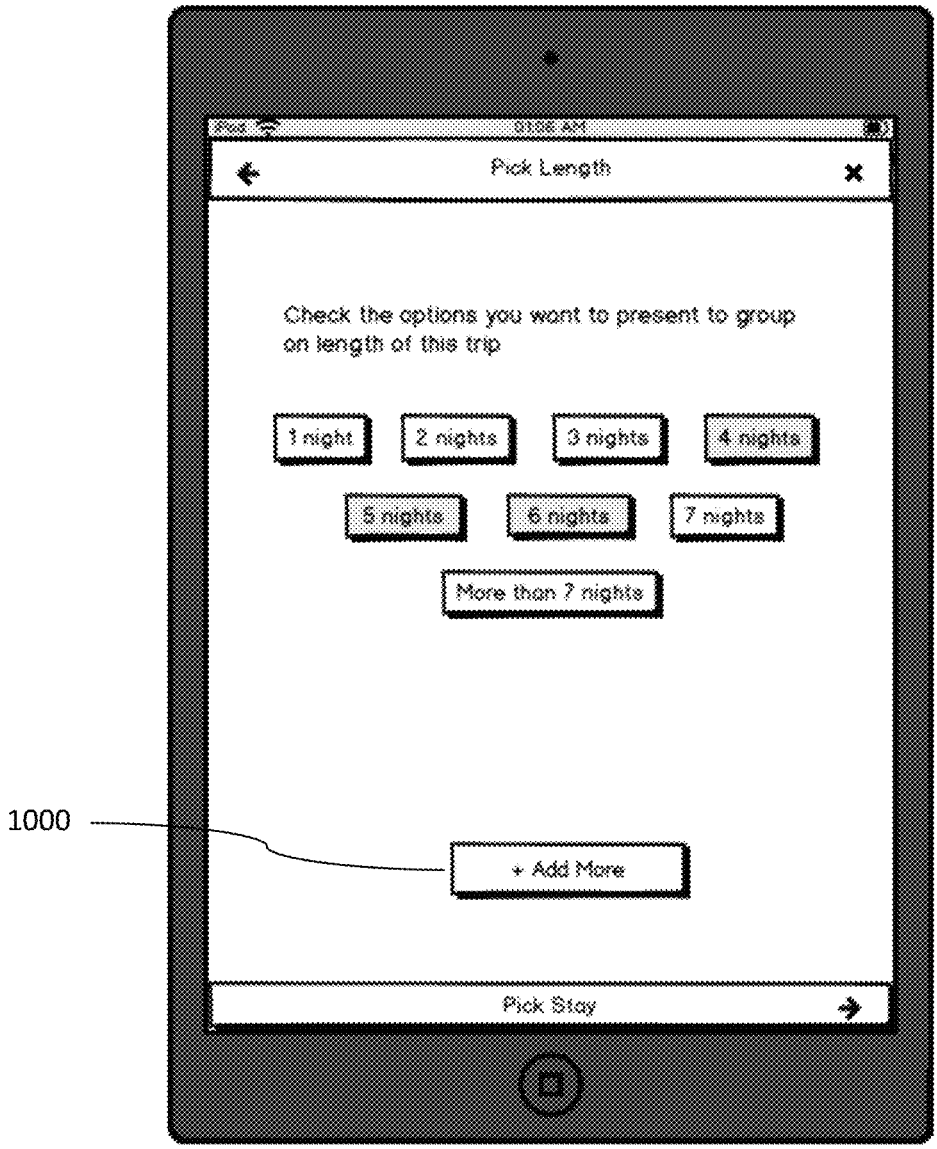

Pick Length
Check the options you want to present to group on length of this trip
1 night
2 nights
3 nights
4 nights
5 nights
6 nights
7 nights
More than 7 nights
1000
+ Add More
Pick Stay

Fig. 10

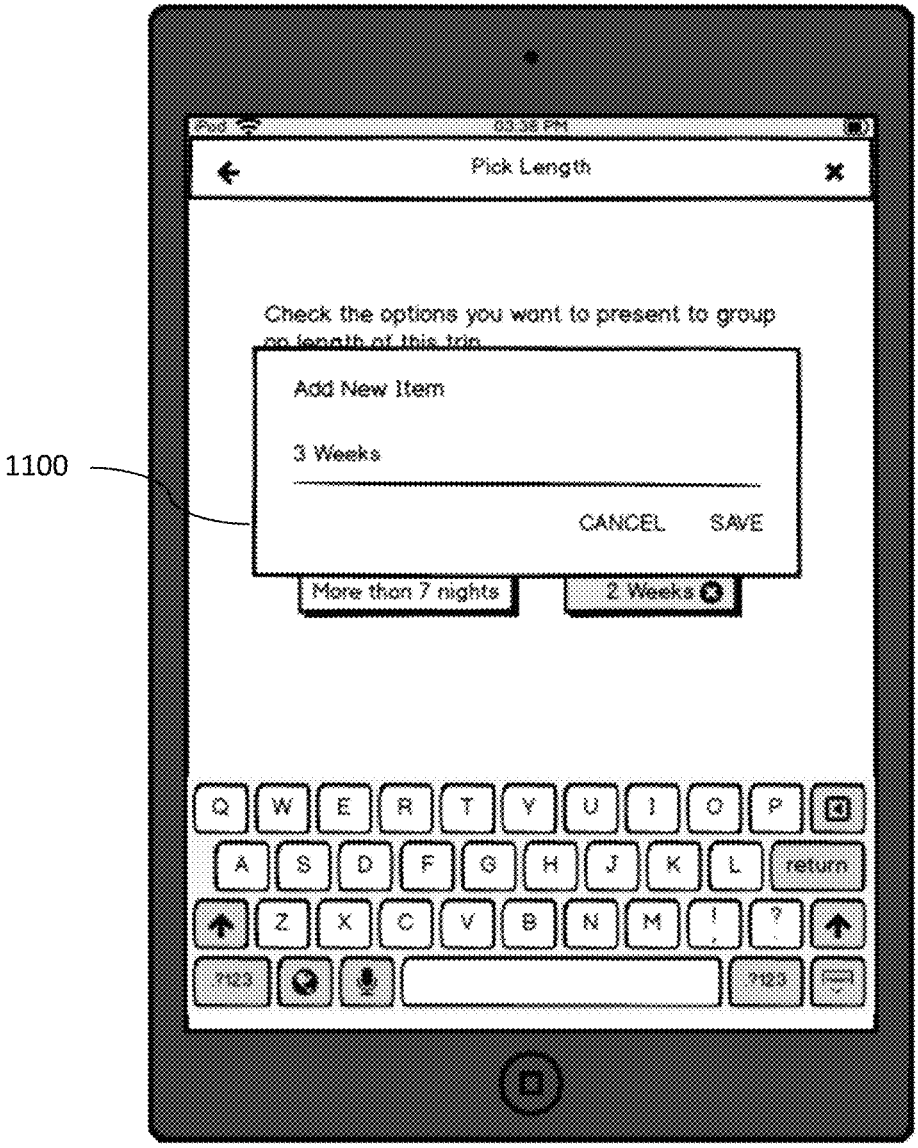

1100
Pick Length
Check the options you want to present to group
Add New Item
3 Weeks
CANCEL
SAVE
More than 7 nights
2 Weeks

Fig. 11

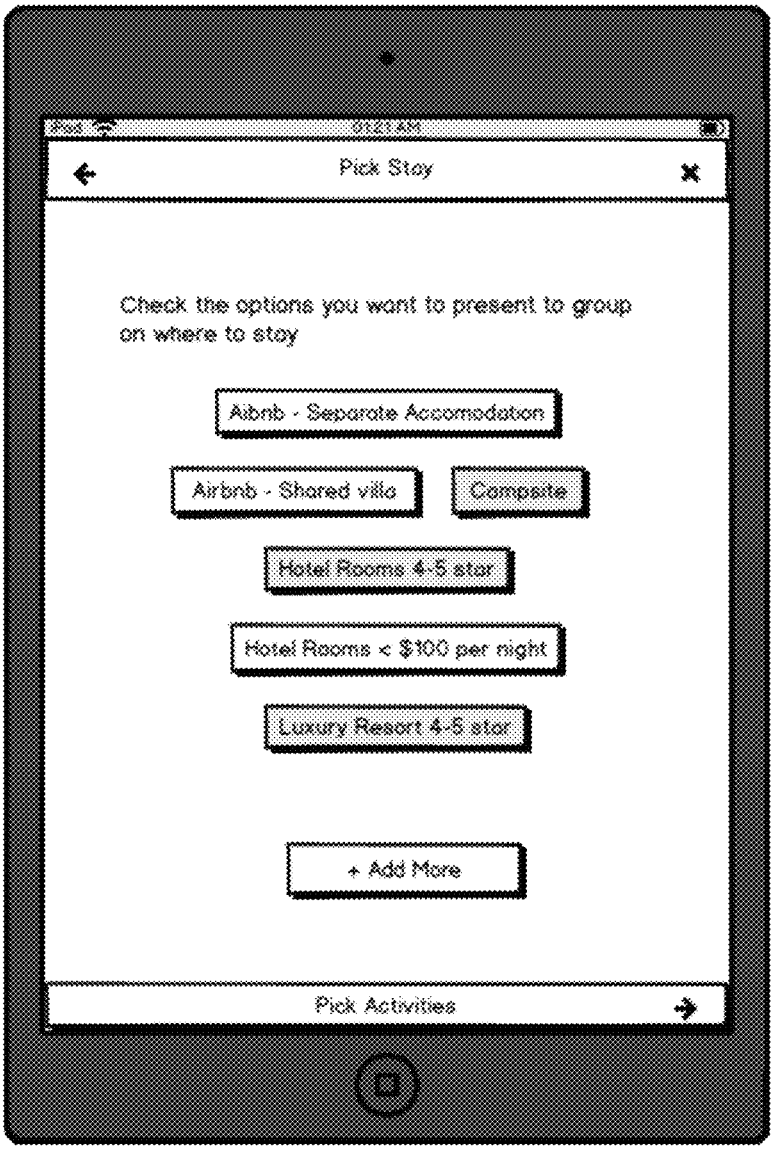

Pick Stay
Check the options you want to present to group on where to stay
Airbnb - Separate Accomodation
Airbnb - Shared villa
Campsite
Hotel Rooms 4-5 star
Hotel Rooms < $100 per night
Luxury Resort 4-5 star
+ Add More
Pick Activities

Fig. 12

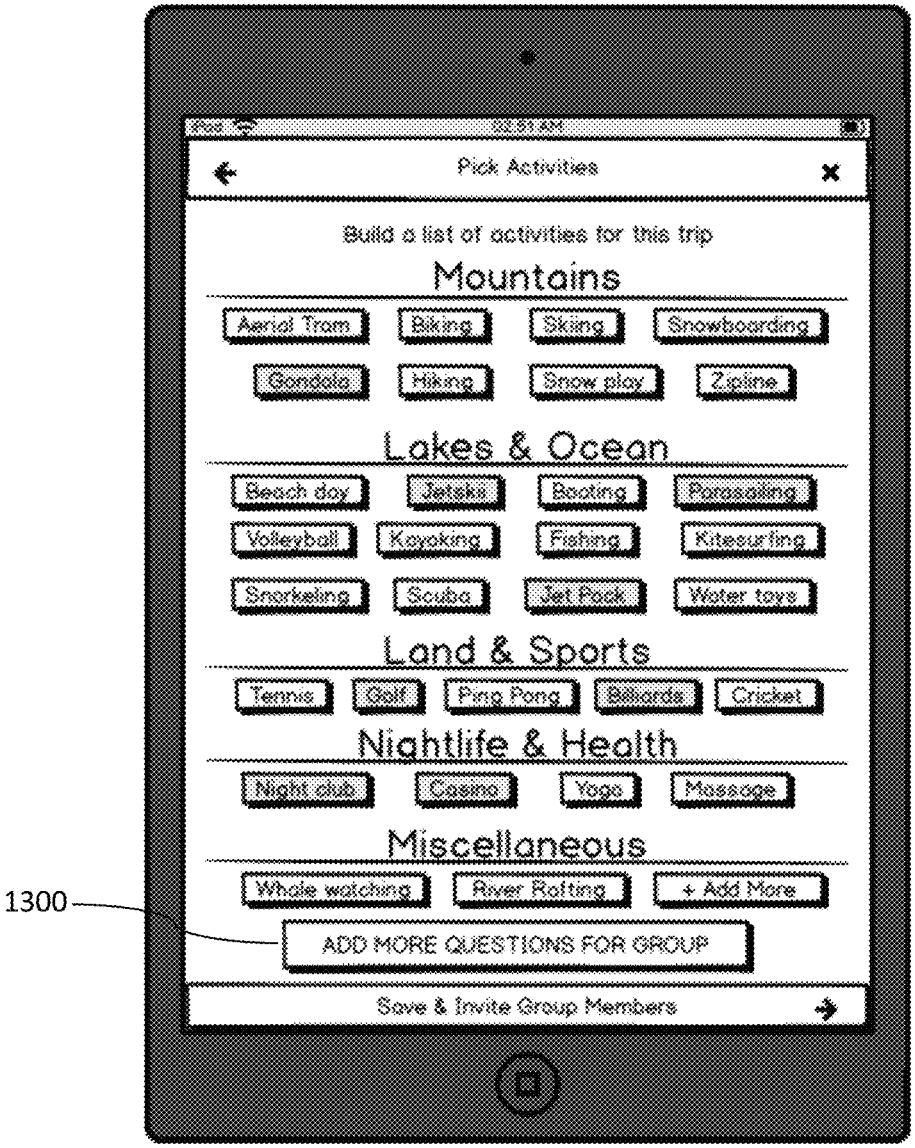

Pick Activities
Build a list of activities for this trip
Mountains
Aerial Tram
Biking
Skiing
Snowboarding
Gondola
Hiking
Snow play
Zipline
Lakes & Ocean
Beach day
Jetski
Boating
Parasailing
Volleyball
Kayaking
Fishing
Kitesurfing
Snorkeling
Scuba
Jet Pack
Water toys
Land & Sports
Tennis
Golf
Ping Pong
Billiards
Cricket
Nightlife & Health
Night club
Casino
Yoga
Massage
Miscellaneous
Whale watching
River Rafting
+ Add More
ADD MORE QUESTIONS FOR GROUP
Save & Invite Group Members
1300

Fig. 13

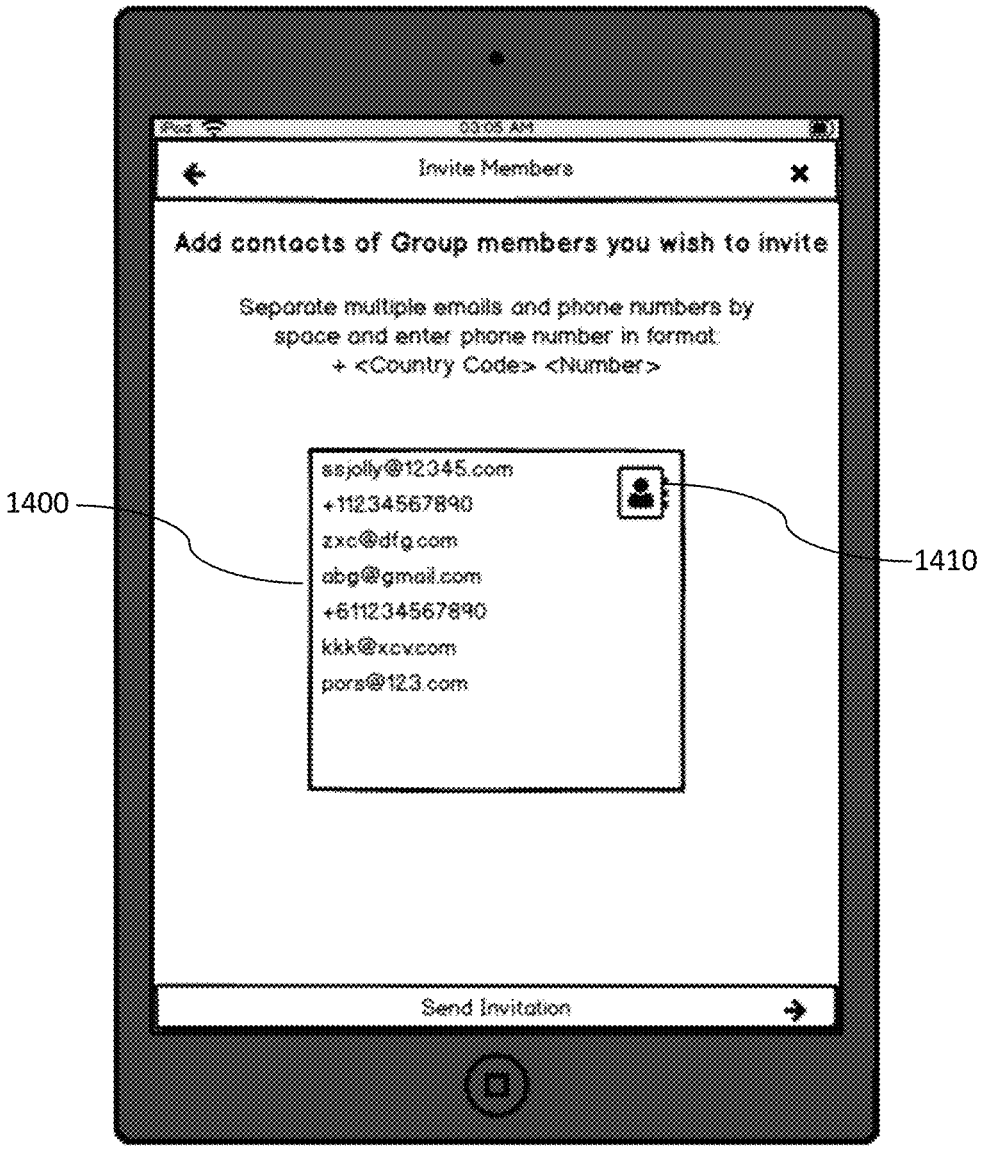

Invite Members
Add contacts of Group members you wish to invite
Separate multiple emails and phone numbers by space and enter phone number in format
+ <Country Code> <Number>
ssjolly@12345.com
+11234567890
zxc@dfg.com
abg@gmail.com
+611234567890
kkk@xcv.com
pors@123.com
Send Invitation
1400
1410

Fig. 14

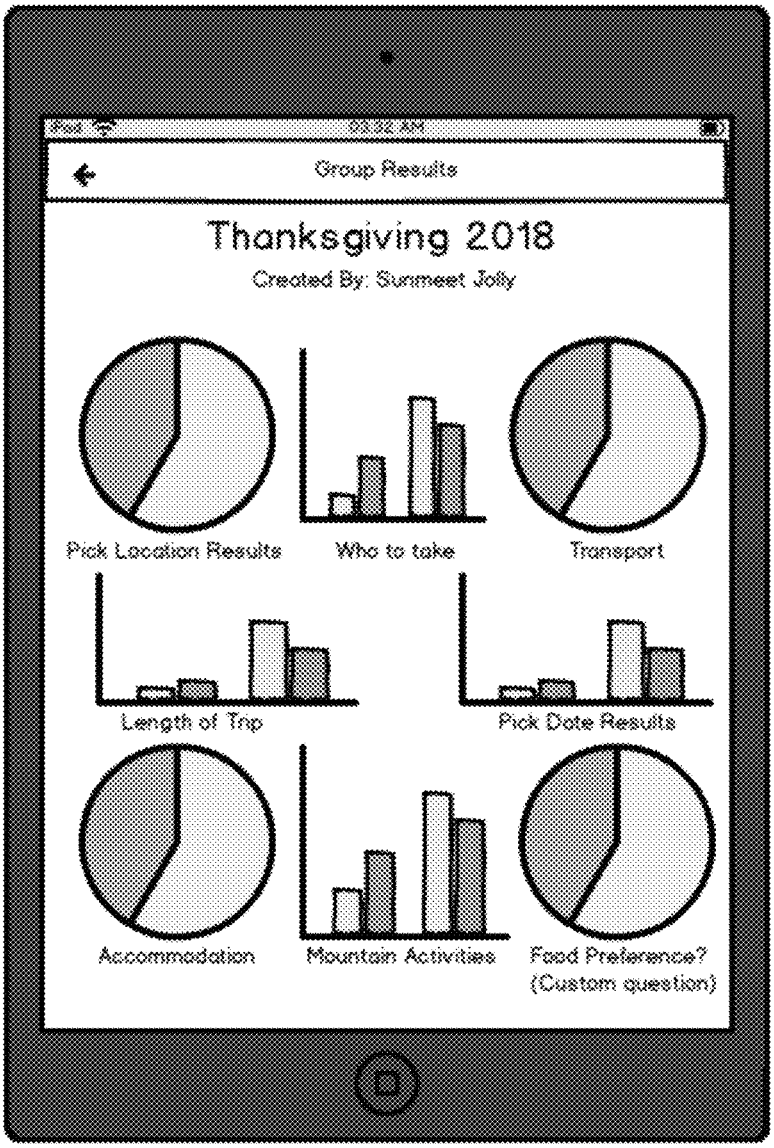

Group Results
Thanksgiving 2018
Created By: Sunmeet Jolly
Pick Location Results
Who to take
Transport
Length of Trip
Pick Date Results
Accommodation
Mountain Activities
Food Preference?
(Custom question)

Fig. 15

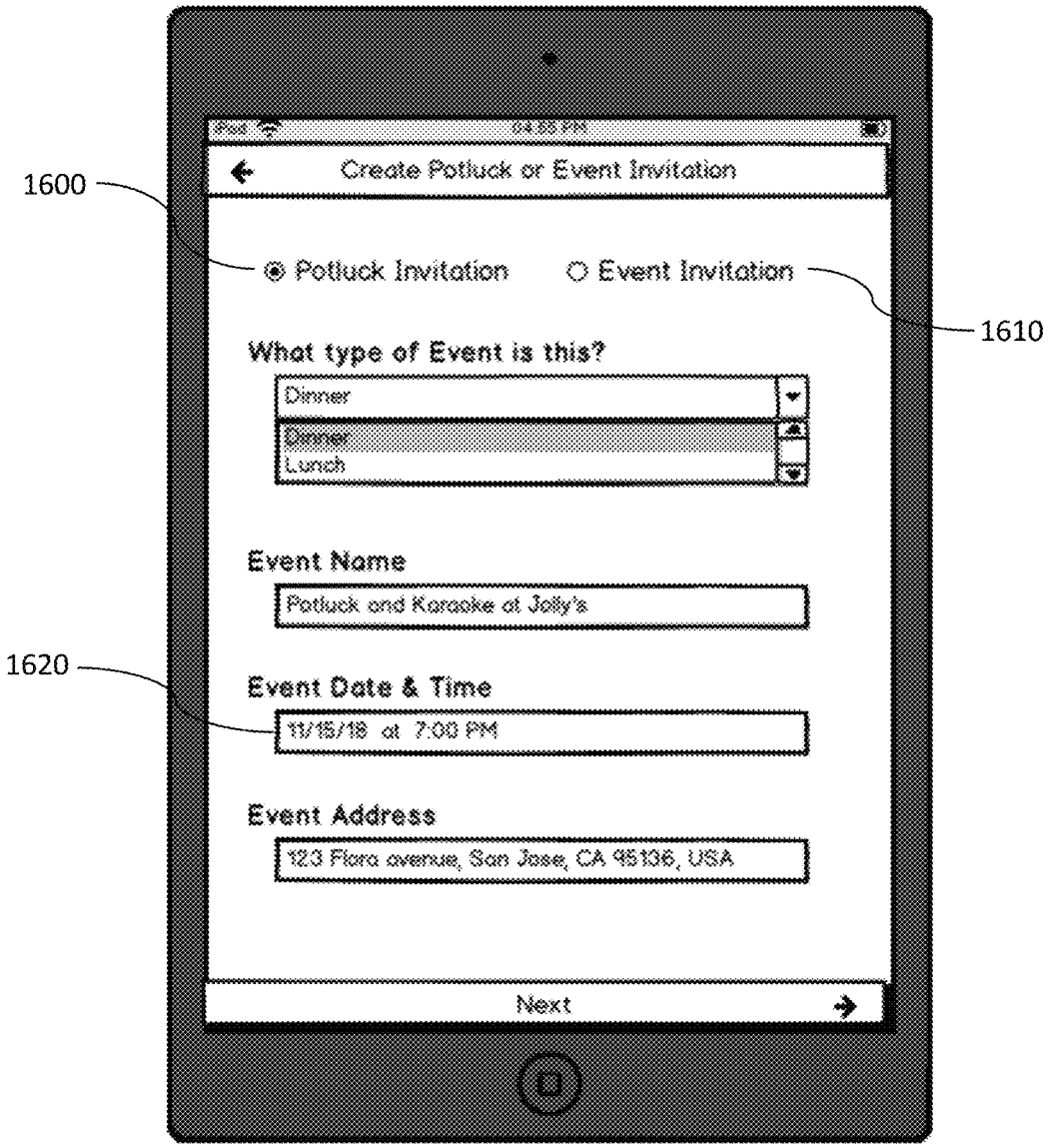

1600
Create Potluck or Event Invitation
Potluck Invitation
Event Invitation
1610
What type of Event is this?
Dinner
Dinner
Lunch
Event Name
Potluck and Karaoke at Jolly's
1620
Event Date & Time
11/15/18 at 7:00 PM
Event Address
123 Flora avenue, San Jose, CA 95136, USA
Next

Fig. 16

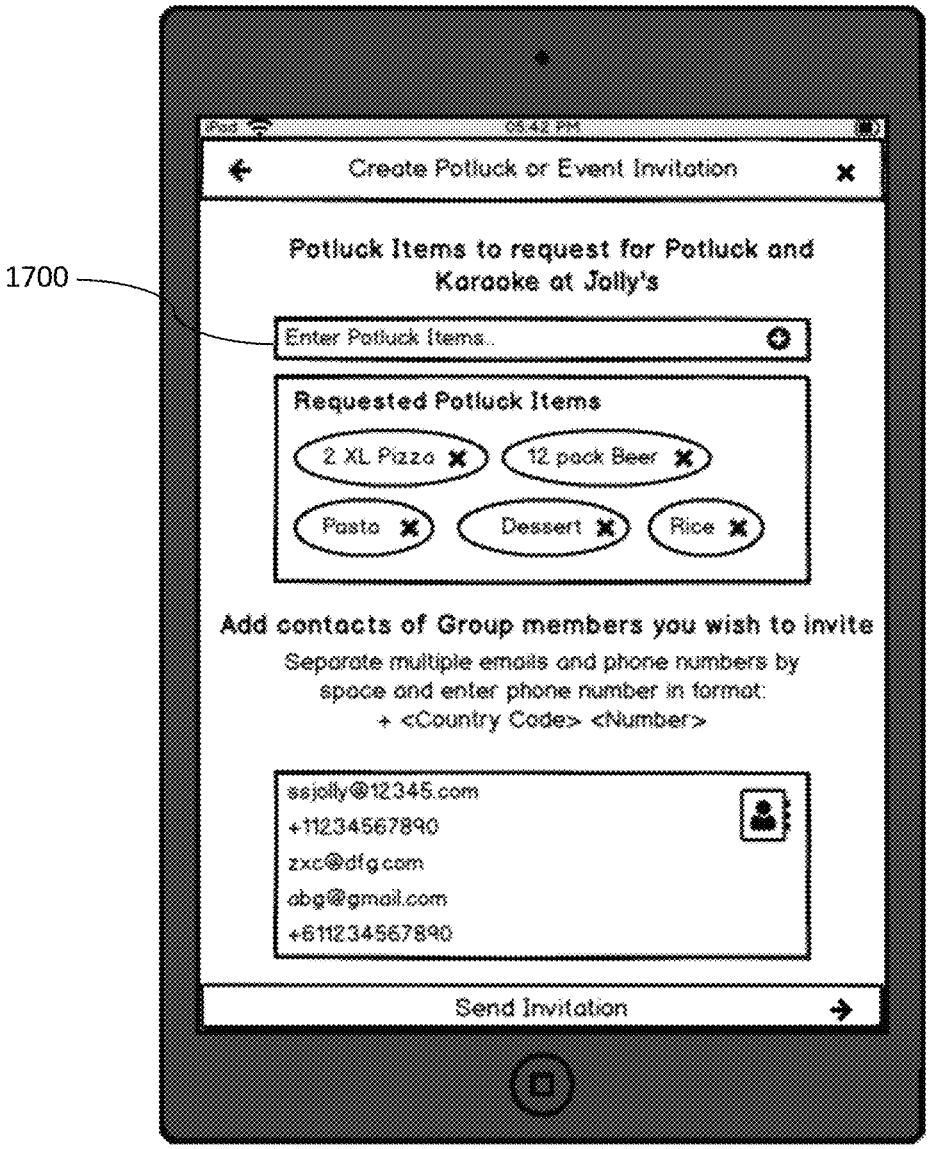

1700
Create Potluck or Event Invitation
Potluck Items to request for Potluck and Karaoke at Jolly's
Enter Potluck Items..
Requested Potluck Items
2 XL Pizza
12 pack Beer
Pasta
Dessert
Rice
Add contacts of Group members you wish to invite
Separate multiple emails and phone numbers by space and enter phone number in format:
+ <Country Code> <Number>
ssjolly@12345.com
+11234567890
zxc@dfg.com
abg@gmail.com
+611234567890
Send Invitation

Fig. 17

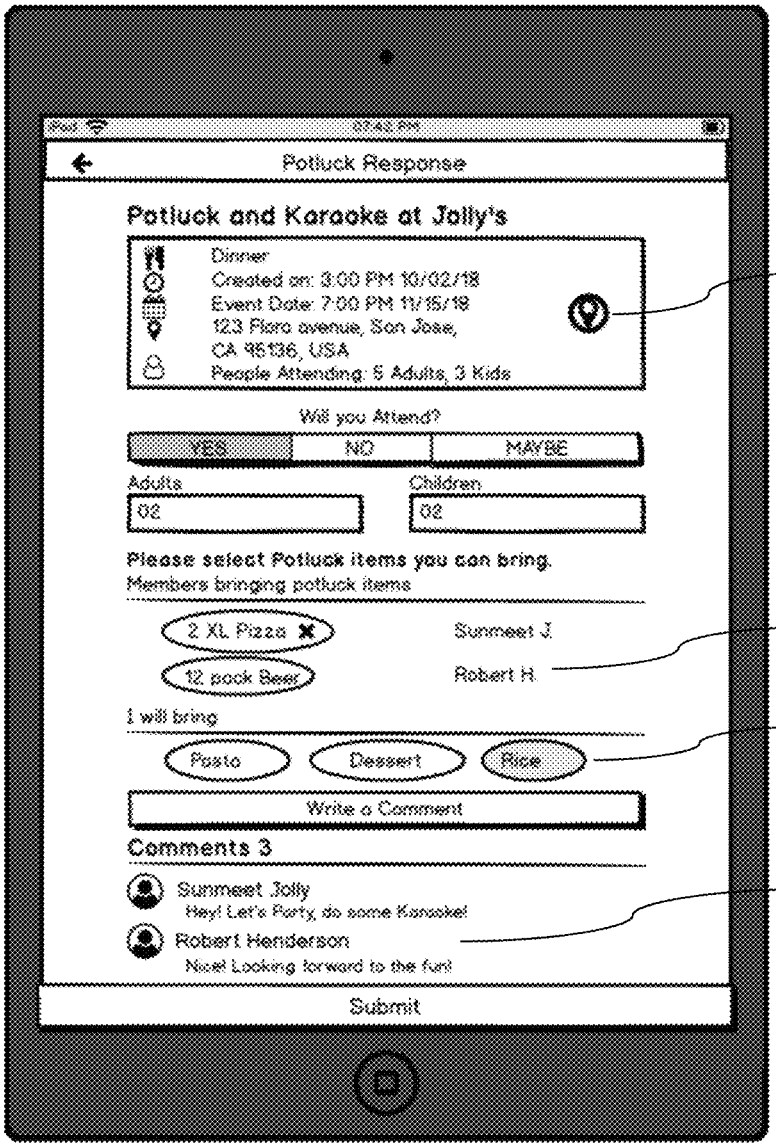

Potluck Response
Potluck and Karaoke at Jolly's
Dinner
Created on: 3:00 PM 10/02/18
Event Date: 7:00 PM 11/15/18
123 Flora avenue, San Jose,
CA 95136, USA
People Attending: 5 Adults, 3 Kids
Will you Attend?
YES
NO
MAYBE
Adults
02
Children
02
Please select Potluck items you can bring.
Members bringing potluck items
2 XL Pizza
Sunmeet J.
12 pack Beer
Robert H.
I will bring
Pasta
Dessert
Rice
Write a Comment
Comments 3
Sunmeet Jolly
Hey! Let's Party, do some Karaoke!
Robert Henderson
Nice! Looking forward to the fun!
Submit
1800
1820
1810
1830

Fig. 18

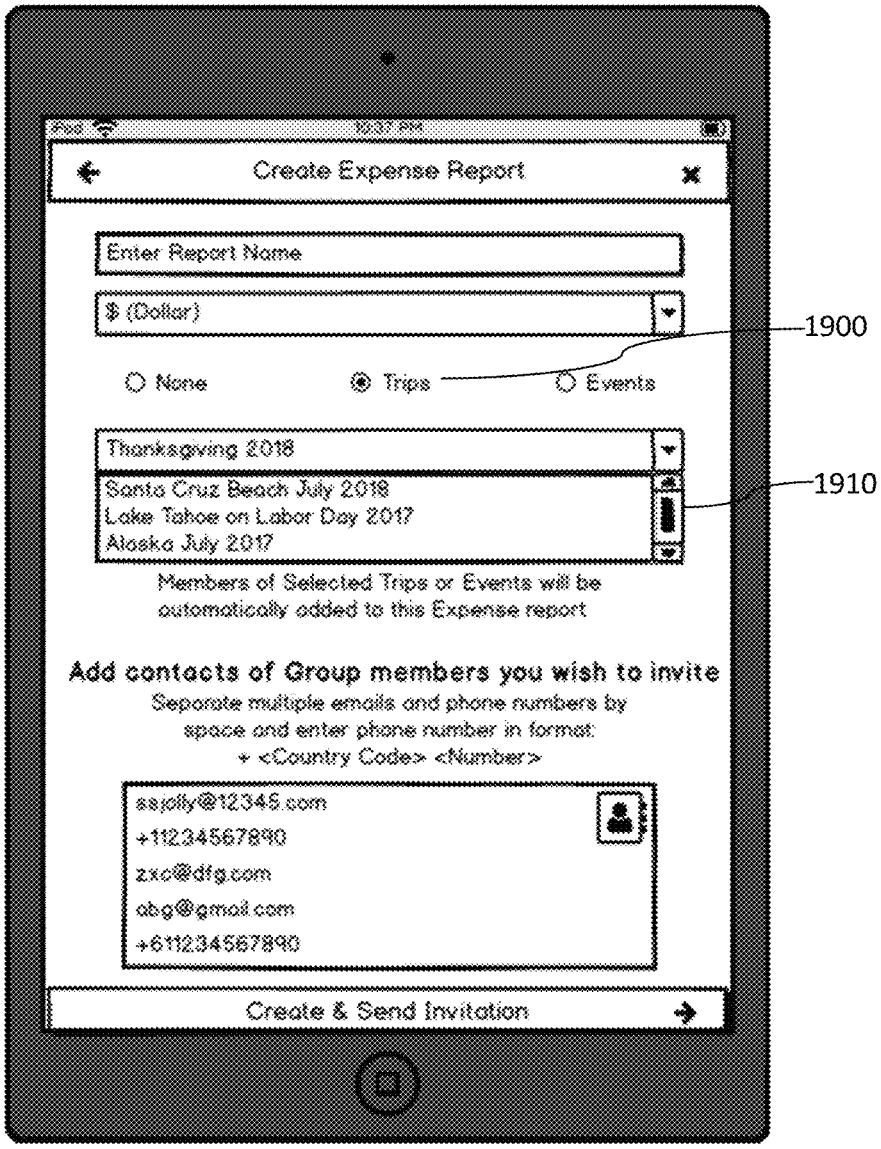

Create Expense Report
Enter Report Name
$ (Dollar)
None
Trips
Events
1900
Thanksgiving 2018
Santa Cruz Beach July 2018
Lake Tahoe on Labor Day 2017
Alaska July 2017
1910
Members of Selected Trips or Events will be automatically added to this Expense report
Add contacts of Group members you wish to invite
Separate multiple emails and phone numbers by space and enter phone number in format: + <Country Code> <Number>
ssjolly@12345.com
+11234567890
zxc@dfg.com
abg@gmail.com
+611234567890
Create & Send Invitation

Fig. 19

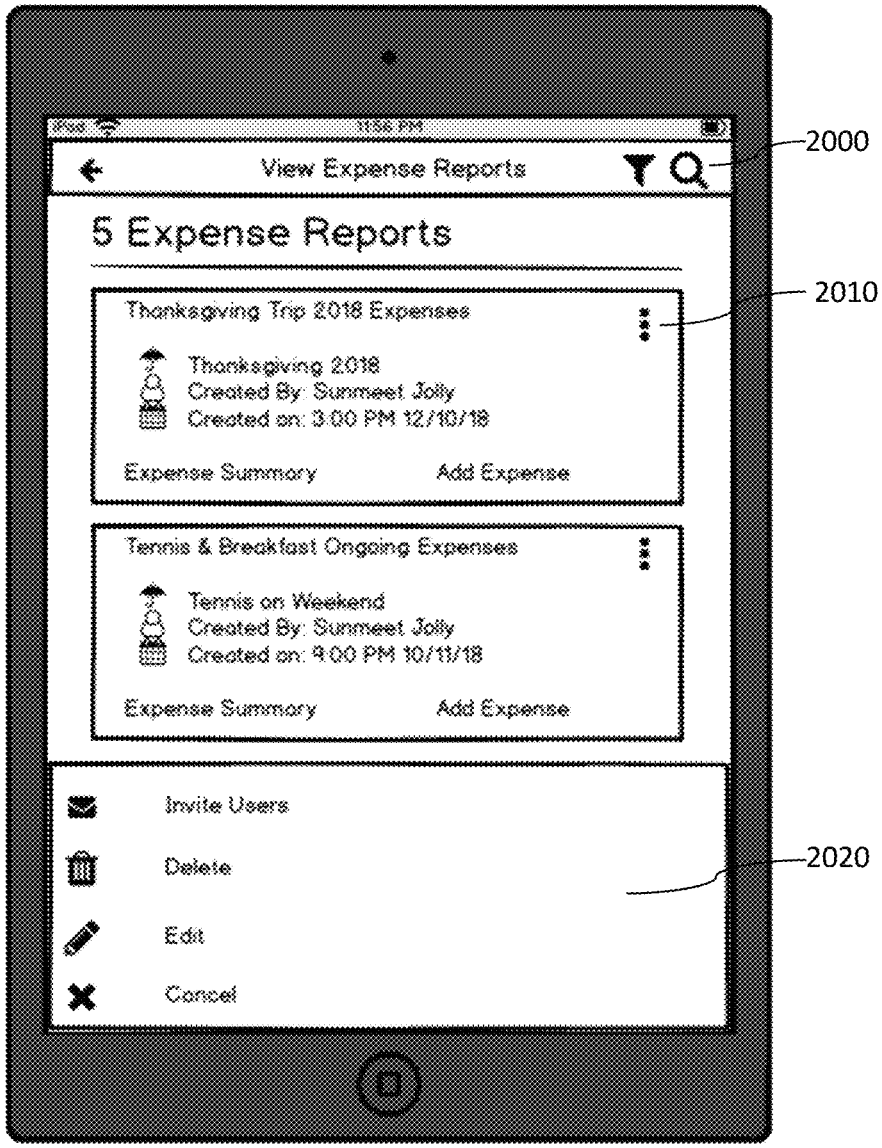

2000
2010
2020
View Expense Reports
5 Expense Reports
Thanksgiving Trip 2018 Expenses
Thanksgiving 2018
Created By: Sunmeet Jolly
Created on: 3:00 PM 12/10/18
Expense Summary
Add Expense
Tennis & Breakfast Ongoing Expenses
Tennis on Weekend
Created By: Sunmeet Jolly
Created on: 9:00 PM 10/11/18
Expense Summary
Add Expense
Invite Users
Delete
Edit
Cancel

Fig. 20

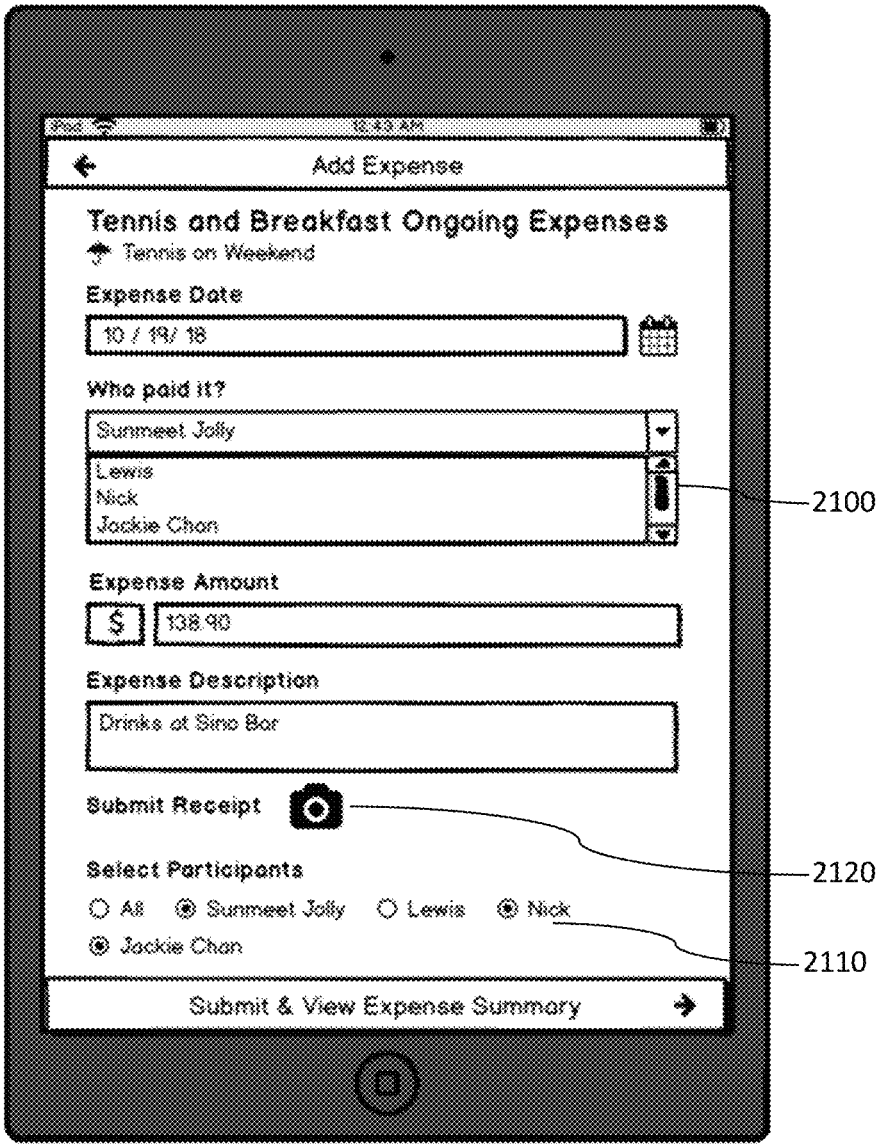

Add Expense
Tennis and Breakfast Ongoing Expenses
Tennis on Weekend
Expense Date
10 / 19/ 18
Who paid it?
Sunmeet Jolly
Lewis
Nick
Jackie Chan
Expense Amount
$
138.90
Expense Description
Drinks at Sino Bar
Submit Receipt
Select Participants
All
Sunmeet Jolly
Lewis
Nick
Jackie Chan
Submit & View Expense Summary
2100
2120
2110

Fig. 21

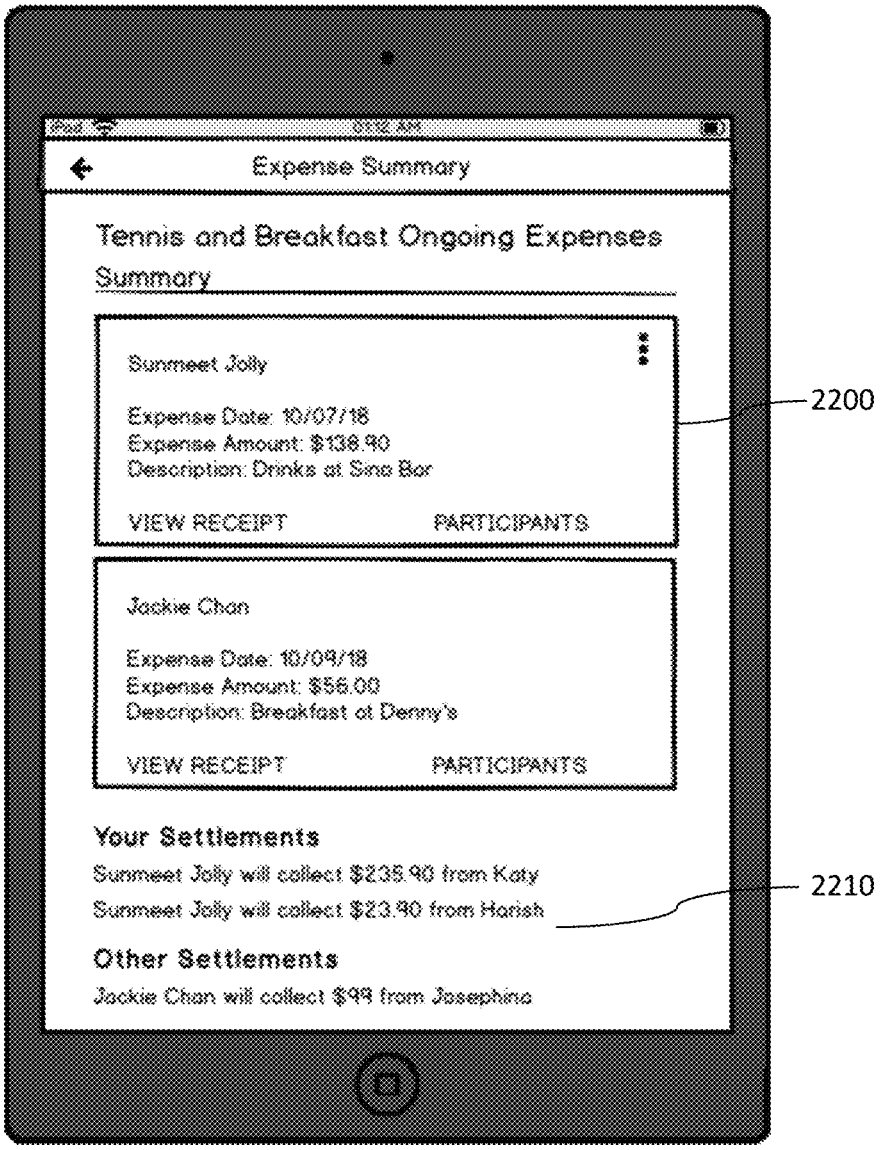

Expense Summary
Tennis and Breakfast Ongoing Expenses
Summary
Sunmeet Jolly
Expense Date: 10/07/18
Expense Amount: $138.90
Description: Drinks at Sins Bar
VIEW RECEIPT
PARTICIPANTS
Jackie Chan
Expense Date: 10/09/18
Expense Amount: $56.00
Description: Breakfast at Denny's
VIEW RECEIPT
PARTICIPANTS
Your Settlements
Sunmeet Jolly will collect $235.90 from Katy
Sunmeet Jolly will collect $23.90 from Harish
Other Settlements
Jackie Chan will collect $99 from Josephine
2200
2210

Fig. 22

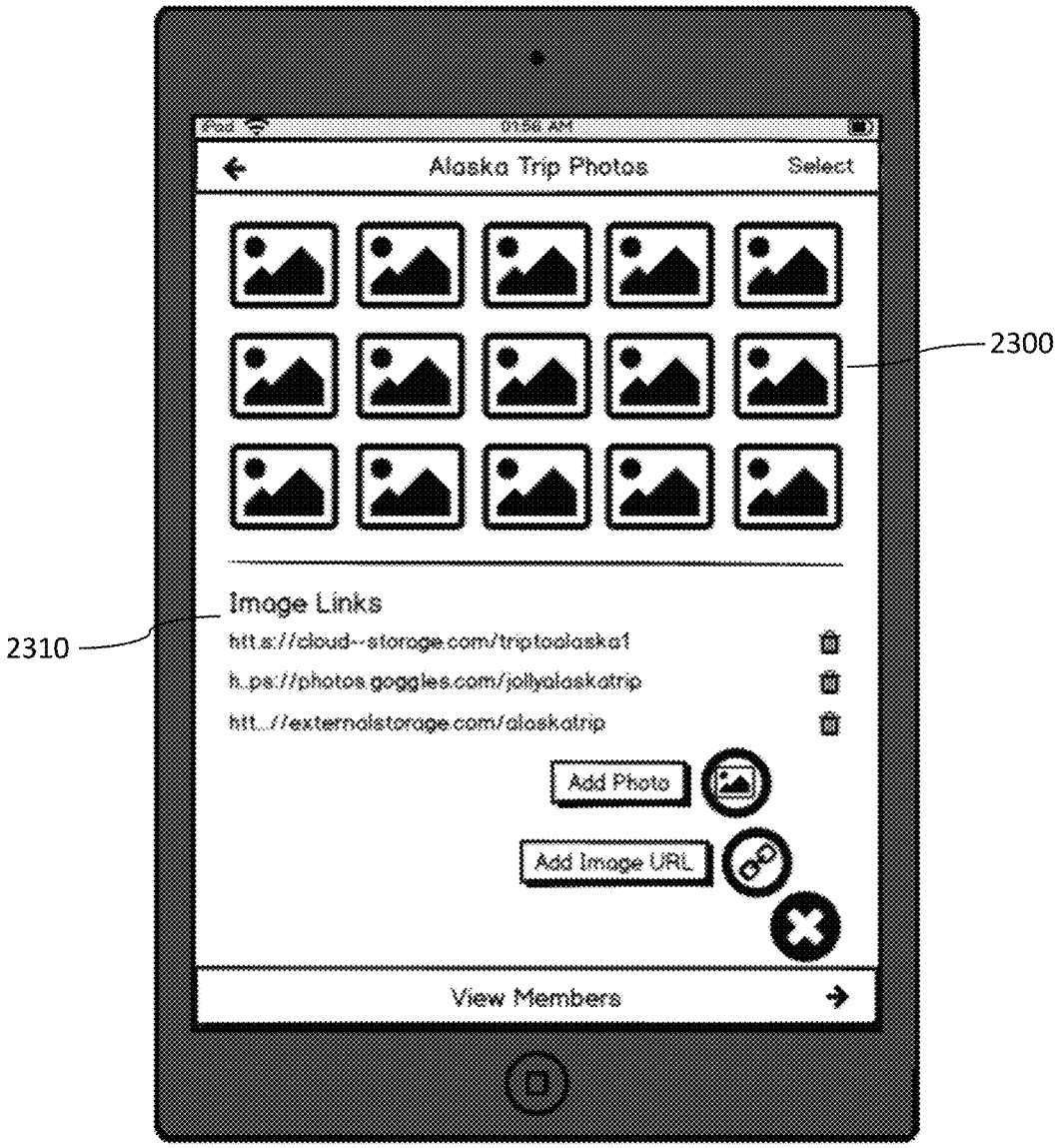

Alaska Trip Photos
Select
2300
Image Links
2310
htt.s://cloud-storage.com/triptoalaska1
h..ps://photos.goggles.com/jollyalaskatrip
htt.../externalstorage.com/alaskatrip
Add Photo
Add Image URL
View Members

Fig. 23

MOBILE AND COMPUTER APPLICATIONS, SYSTEMS AND METHODS FOR LARGE GROUP TRAVEL AND EVENT MANAGEMENT

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of Provisional Patent Application Ser. No. 62/589,149 filed Nov. 21, 2017 by the present inventor, which is incorporated by reference.

BACKGROUND

Prior Art

The following is a tabulation of some prior art that presently appears relevant:

U.S. Patents

Pat. No.	Issue Date	Patentee
U.S. Pat. No. 8,244,848 B1	Aug. 14, 2012	Narayanan et al.
U.S. Pat. No. 8,498,900 B1	Jul. 30, 2013	Spirin et al.
U.S. Pat. No. 8,863,245 B1	Oct. 14, 2014	Abhyanker
U.S. Pat. No. 9,123,038 B2	Sep. 1, 2015	Cozens et al.
U.S. Pat. No. 9,294,623 B2	Mar. 22, 2016	Oberoi et al.
U.S. Pat. No. 9,355,394 B2	May 31, 2016	Gupta
U.S. Pat. No. 9,552,558 B2	Jan. 24, 2017	Pinard
U.S. Pat. No. 9,654,288 B1	May 16, 2017	Howell et al.
U.S. Pat. No. 9,704,109 B2	Jul. 11, 2017	Geraci et al.
U.S. Pat. No. 9,704,110 B2	Jul. 11, 2017	Shaw et al.
U.S. Pat. No. 9,710,801 B2	Jul. 18, 2017	Aadi et al.
U.S. Pat. No. 9,712,468 B2	Jul. 18, 2017	Patel

U.S. Patent Application Publications

Publication No.	Pub. Date	Applicant
U.S. 2009/0055488 A1	Feb. 26, 2009	Berry et al.
U.S. 2013/0297692 A1	Nov. 7, 2013	Raji et al.
U.S. 2013/0298043 A1	Nov. 7, 2013	Bailey
U.S. 2013/0330019 A1	Dec. 12, 2013	Kim et al.
U.S. 2014/0236647 A1	Aug. 21, 2014	Wettan
U.S. 2014/0278593 A1	Sep. 18, 2014	Brunn
U.S. 2014/0343990 A1	Nov. 20, 2014	Photowat
U.S. 2016/0162945 A1	Jun. 9, 2016	Turner et al.
U.S. 2017/0286941 A1	Oct. 5, 2017	Aadi et al.
U.S. 2017/0316524 A1	Nov. 2, 2017	Amzallag et al.

Billions of people are now connected in Groups via Chat apps and other Social media apps and websites. People form groups based on relations, affiliations, interests etc. An individual can be a member of multiple private groups including connections among Colleagues, School Friends, College Friends, Family, Club members, Sports meet members, Religious group, Neighborhood group etc. While Chat apps and Social media websites are optimized for faster, cheaper Communication among group members, they are ill equipped to help in Organizing Travel and Events especially where data organization or analytics becomes essential.

Group travel, Parties, Potluck dinners, Weekend getaways, Cruises, Picnics, Sports meets, Festival celebrations and other gatherings are becoming larger in size due to easy communication among group members using chat or social media. It's easy to call out in a 50 people chat group "Hey, let's go somewhere during this Christmas break!" and 20 friends say "Yes, lets plan it!". The complexity to organize

increases many folds because of choices available, Group member preferences and Group size. Where to go? When? Who to take along? Activities? Budget? Transportation? Accommodation? Trip length? Flights? Shared Responsibilities? Expense sharing? etc. Conflict arises if Group member voices are not heard, and current Social media and chat platforms are not adequately equipped to handle group surveys, manage group expenditure, manage shared responsibility assignment and organize photos.

A very popular chat app used by over a billion people sends messages, photos, links etc. to users as they keep coming from other users in group. Jokes, Discussions, Forwarded News, Videos, Photos, Links to other internet sites, all make up a part of daily chat volume. Sometimes a few group members get into heated discussion and the chat volume spikes regardless of the interest of other group members. But there is no way for others to sort and filter out meaningful information without reading every message. Some people get busy for few days and switch off from chat because they can't keep pace with it. Will they miss your Potluck invitation? If your event is 3 weeks later, will you keep reading all chat messages for next 3 weeks to find RSVP information and writing down who's bringing what to the potluck? How will other group members know who is bringing what to party and what's still left to be brought? That means everyone has to read all messages to keep up, and take notes. And all this while your group members not attending your event waste their time looking at your event RSVP and potluck items in chat.

Its normal after a large group travel or event to share photos in the chat group where it all initiated. But if you do not save those in your device, they will be lost like needles in haystack in few days depending on chat volume. Try going back 3 months to look for Group pictures of a party you had with your chat group buddies. It's possible that photos have been deleted to save mobile phone memory. There are other social media sites that store photo albums and let you share with friends, but do not provide ability to store hyperlinks to external storage where your other friends might want to store their pictures. They also require membership and connection between friends, but provide limited control over who can see your photos on internet. For instance, if my friend requests me to add trip photos to her album, she (not I) can chose its privacy setting to be visible to public or her other friends.

Also, some social media sites run massive advertising, which you "have to" see in order to access your own photos or a friend's photo albums. They do not yet offer an ad-free version for people who would rather pay a subscription fee to avoid seeing too many commercials.

Another frequent requirement of Group Travel and Events planning is a need to manage expenses. The group may be planning an event with shared responsibilities of sourcing party items. One group member orders restaurant food (larger expense), while other might be buying Liquor and other take on DJ and Photography expense and someone buys soft drinks and pizza while others buy nothing but want to pay their dues. Similarly, when on large group travel, a few friends might go to bar for a drink while larger group will pay for dinner at restaurant. A subset of group wants to go on Boy's fishing trip while ladies enjoy a show. Many merchants refuse to split bill into more than certain number of credit cards as it's an overhead for their already busy staff to run multiple cards and seek signatures. Also, if not stored safely, Expense receipts can get lost while on a trip, and you

may forget about cash transactions unless recorded somewhere. But many people do not take computer or have access to scanner on trips.

Technology savvy people have used a mix of what's available in consumer technology to solve some of these problems. We discussed chat apps already. Some people use Online spreadsheets to prepare a list of Potluck items and provide link to friends in chat group. Spreadsheets have also been used for sharing expenses for group events. But the link can get lost like needle in haystack of daily chat volume. Similarly, to create survey among friends, one group member volunteers and creates an online survey using online forms, where they type all questions and answer choices and provide link to survey on chat window. Again, that link can get lost in daily chat volume.

Another problem with linking online spreadsheets and forms in mobile chat windows is that they open in mobile's web browser. The user experience (UX) is horrible as most of these websites and forms are not optimized to be viewed in mobile web browsers. They are awfully slow to load and page formatting does not fit small mobile phone screens. The buttons, links and text entry is nightmare in websites that open in mobile web browsers.

A lot of these consumer facing technologies were first built to be accessed on Internet browsers and are now being customized for mobile phones in last few years. But they are far from achieving performance and user experience levels that are achieved by Mobile apps that are custom built, optimized and tested for their respective mobile hardware platforms. In short, its much quicker and more user friendly to access information on your bank's mobile app on your phone, than to access their website on your mobile phone browser, because websites are optimized for laptop or desktop web browsers (large screens with Wi Fi connection) and not for smaller mobile screens, operating while on cellular network.

Trusted research has shown that more than 80% of social interactions happen on mobile phones. And there is technology fatigue among consumers when it comes to linking too many technologies together or using too many different apps and websites. For example, if all the use cases mentioned above and listed problems were being solved by separate mobile apps, users will need to download and learn using many such apps, have separate login and passwords, friend lists and connections in each. And significant resources will be wasted in marketing and acquiring users for variety of technologies and apps making it unviable for app publishers. Since group events and travel planning largely happens among close connections, there is need for a single mobile app for these use cases.

That convinced us to build GROTU mobile app for iOS and Android platforms from grounds up. We have made a humble attempt to solve problems listed above, and designed and made available GROTU app to be used worldwide by groups planning travel and events frequently.

SUMMARY OF THE INVENTION

In first released embodiment of the invention, GROTU mobile app, the Group Travel and Event management application solves each of these problems by using Computer networking, Internet cloud and Mobile smartphone's camera, computing power, storage and graphical user interface abilities helping users in 1) Creating Travel surveys from pre-built, customizable template for voting on Group choices 2) Organize photos and external storage hyperlinks in photo albums that can be organized by trips and events and stored in cloud 3) Group expenditure management using smartphone camera for photo receipts uploading 4) Calculation, storage and settlement of funds including maintaining ledger balance for each active expense report 5) Event Invitations via SMS, Email and Push Notifications including Potluck items management with cloud sync for real time updates to group members 6) Organized group chat specific to an event or trip plan 7) Easy search, filter and deletion of records by organizing and storing data and files in database in cloud.

GROTU saves users significant time and effort by passing relevant data between its different modules. For instance, after an event (or trip) is over, you can invite the members of that event (or trip) directly into Expense report, or shared Photo album. Similarly, GROTU saves a list of user's frequently invited friends so users don't have to search for phone book entries each time an invitation needs to be sent out.

GROTU app can be downloaded from Apple app store for use on iOS phones and tablets (iPhone, iPad) and from Google Play store for use on Android phones and tablets. Majority of world today uses either Android or iOS mobile devices, and GROTU app works efficiently between these devices syncing data and images back and forth with internet cloud servers using AWS (Amazon Web Services) computing and storage backend.

DRAWINGS—FIGURES

FIG. **1** is a block diagram depicting data synchronization between front end users using iOS and Android hardware devices running GROTU mobile app, Admin console users, and different components of backend Cloud infrastructure running on AWS (Amazon Web Services).

FIG. **2** depicts various building blocks of GROTU app, focusing on the APIs (Application Program Interfaces) and SDKs (Software Development Kits) used to build and operate the various mobile app functions of GROTU.

FIG. **3** depicts the Home screen of GROTU app with its major modules providing desired functionality

FIG. **4** depicts Login and Signup user interface of GROTU app

FIG. **5** depicts key account management fields in User profile

FIG. **6** depicts the beginning screen of Travel survey creation process

FIG. **7** shows date picker user interface for travel survey creation

FIG. **8** shows a travel survey creation screen seeking group inputs on who to travel with

FIG. **9** shows a travel survey creation screen seeking group inputs on transportation choices

FIG. **10** depicts trip length options for travel survey creation

FIG. **11** depicts user interface elements used to customize the travel survey

FIG. **12** depicts stay options to choose for travel survey creation

FIG. **13** shows a variety of pre-built activity list that survey creator can pick from

FIG. **14** shows user interface for sending invitations to group members using email and phone numbers

FIG. **15** depicts travel survey result charts after invited group members vote using their GROTU app accounts on their mobile phones

FIG. **16** shows the user interface elements in GROTU app for creating a Potluck or Event invitation

FIG. **17** further shows the steps of Potluck event creation and initiation workflow

FIG. **18** shows user interface and steps required of a group member to respond to a potluck invitation including items view and group chat

FIG. **19** shows user interface and workflow to create a group expense report using GROTU app

FIG. **20** depicts user experience within GROTU app as it relates to search, filter, edit, inviting additional users, access and delete Expense reports or other records in app

FIG. **21** depicts user interface elements and workflow to add a new expense to group expense report

FIG. **22** shows how an expense summary and settlements are displayed to all group members participating in the expense report

FIG. **23** depicts a group photo album where invited group members have contributed pictures and hyperlinks to any external storage site where they may have stored their trip photos

DETAILED DESCRIPTION OF THE EMBODIMENTS

The following description is intended to convey a thorough understanding of the invention by providing a number of specific embodiments and details involving a system and method for providing tools to help groups plan travel and events better, using modern hardware, software and processes. It is understood, however that the invention is not limited to these specific embodiments and details, which are exemplary only. It is further understood that one possessing ordinary skill in the art, in light of known systems and methods, would appreciate the use of the GROTU mobile app for its intended purposes and benefits in any number of alternative embodiments, depending upon specific design and other needs.

FIG. **1** is a block diagram depicting data synchronization between front end users using iOS hardware **100** and Android hardware devices **110** running GROTU mobile app, Admin console users **120**, and different components of backend Cloud infrastructure running on AWS (Amazon Web Services). Essential to functioning of current embodiment of this invention, downloadable as GROTU mobile app, is extensive software development effort for these two distinct platforms. iOS devices such as iPhone and iPad run iOS software provided by Apple that only operates iOS mobile devices sold by Apple. iOS software **100** controls different parts of iPhones and iPads including but not limited to mobile device's random access memory (RAM), processor (CPU), display, graphical user interface (GUI) elements, camera, storage, phone contacts, messaging (SMS), email, maps (GPS), web browser, apps, photo storage etc. Building the GROTU app for iOS requires building, testing, getting Apple's approval and making the .IPA file available for download worldwide on Apple app store. An .IPA (iOS app store Package) file is an iOS application archive file which stores an iOS app. Each .IPA file includes a binary that can only be installed on an iOS **100** device. On the other hand, Android operating system provided by Google runs on a vast majority of phones and tablets in the world, manufactured and marketed by leading companies including Google, Samsung, Huawei, Oppo, LG, Xiaomi, Sony etc. Android OS controls different hardware and software components in these phones. Building GROTU app for Android phones **110** requires software development, testing, getting Google's approval and making the .APK file available for download worldwide on Google Play store or other Android stores. Android Package file (.APK) is the package file format used by Android operating system **110** for distribution and installation of mobile apps and middleware. Most phones in world are operated using either iOS or Android operating systems. Once the .IPA or .APK files are downloaded by users on their respective mobile devices, they can sign up and start using the GROTU app connecting with friends, family etc. to plan group travel and events effectively.

First embodiment of GROTU app uses internet cloud infrastructure provided by AWS (Amazon Web Services) including Amazon S3 **140** to store image files, Amazon RDS **160** for operating scalable MySQL relational database servers **160** using Amazon EC2 web services **170** for scalable computing power and GoDaddy for DNS services and SSL **130** certificate. Within a Virtual private cloud (VPC), you can have a Private Subnet **160** containing MySQL database and also a Public Subnet **150** reachable from internet containing web server (NGINX). Admin console **120** that provides administrative access to user's data has a front end that can be accessed using internet browsers like Safari and Chrome. Admin users **120** have the ability to view partial user records and selectively erase user data and delete or disable user accounts upon request. Drupal CMS framework (PHP based) has been used in building internet browser based Admin console for GROTU app. Variety of other technologies including HTML, JavaScript, CSS, React etc. can also be used to build web front end for admin console or provide web access to users.

FIG. **2** depicts various building blocks of GROTU app, focusing on the APIs (Application Program Interfaces) and SDKs (Software Development Kits) used to build and operate the various mobile app functions of GROTU. To make this invention practicable, access to iOS developer console **210** and Google Play console **240** are must and can be obtained by registering in Apple developer program and Android developer's programs respectively. Sign up on iTunes connect **200** is required to release your app on Apple App Store. Both programs charge annual fee and provide access to their respective SDKs and APIs. GROTU Android Application (.APK) can be developed in Java programming language using the Android software development kit (SDK). A wide variety of IDEs and languages can be used for Android development but JAVA with Android Studio is most common and Google's preferred option. GROTU iOS app (.IPA) can be developed on Apple's Xcode Integrated development environment using Swift and Objective-C programming languages. However, we generated the native .APK and .IPA files for GROTU app using React Native framework which generates Native Android and iOS apps using open source components and libraries integrated using JavaScript and React. Because Apple desires specific language in app metadata related to in-app purchases and our iTunes **200** developer contract, we had to customize the iOS build a bit more before Apple approved it for downloading on App store. For Push notifications and other backend functions and analytics, we use Firebase **220** which is now owned by Google and is well integrated with Google Play console **240** and with AdMob **230** which is being used to serve interstitial and banner ads inside GROTU app. Login with Google is also enabled using Google developers **240** SDKs. Facebook developer console and APIs **250** provide Facebook login option for users and also Analytics and possibility of using Advertising services from Facebook ad network when desired. Twilio APIs **270** provide SMS ability inside GROTU app to help route invitation requests using worldwide phone numbers while SendGrid **260** is used to route email invitations to users. These technology stacks,

APIs and SDKs are exemplary, considered best in trade and used by leading apps, however alternative embodiments of this invention can use other technologies like mobile phone SMS, email or other vendors including alternate advertising networks, own advertising contracts and may chose not to use social logins at all.

FIG. **3** illustrates the Home screen user interface of GROTU app with its major modules providing navigation to desired functionality. On top left is navigation menu UI control **360** that opens left side drawer of app with buttons and links to account management features, upgrades, social sharing links, push notifications settings etc. To Create a new Trip survey to be sent to group for voting, user clicks top left button **300** which takes the user to screen for starting survey creation. To view a list of Trip surveys that user created and was invited for, and to view Group results of those surveys, user needs to click "View Trips" button **310** that takes user to relevant screen in app for further action. Users click "Potluck, Party, Event Planner" button **320** to send or respond to Event invitations including Potluck invites and to chat with other group members regarding those events. To add or access group photo albums, user clicks the "Group photo organizer" **330** button. The "Create new expense report" button **340** takes users to screen for initiating a new expense report and inviting group members for that expense report. To view a list of Expense reports that user created or was invited to and to further access Expense addition menu and to view expense summary or receipts, user clicks the "View Expense Reports" **350** button.

FIG. **4** depicts Login and Signup user interface of GROTU app with three different ways for users to sign up and login. Besides social logins using Facebook account or Google account, users can use email and password **400** to create an account. A verification email is sent to user's email account with a link they need to click to authenticate the email. For such users, when they forget password, they can create new password by providing their email and a link is sent to their email that takes them to a screen on web browser window where they can enter a new password and confirm it. That resets the password for users.

FIG. **5** depicts key account management fields in User profile that can be accessed using "My account" link in left drawer from home screen. While email **510** and phone number **500** in correct format are mandatory for signing into GROTU app as each user account is uniquely identified using these fields, Payment option **530** and user's profile picture **520** are optional. GROTU's current embodiment does not process payments through the app and this field is for general information for anybody to externally transfer money to friends using means specified by user. User can use phone camera to take their photo and upload as profile picture **520** or add a photo from gallery.

FIG. **6** depicts the beginning screen of Travel survey creation process. At least one user needs to have GROTU app downloaded in their phone to start creating the survey and invite other members to vote on travel choices. User reaches this screen from Home screen and names the trip and enters all destinations **600** they want the invited members to vote on.

FIG. **7** shows date picker user interface for travel survey creation. The survey creator user picks a number of dates **700** for their group members to vote on, specifying their choice of when they want to go on the trip.

FIG. **8** shows a travel survey creation screen seeking group inputs on who to travel with. GROTU app provides a lot of pre-built options for survey creators to pick from, by simply clicking buttons. Because current embodiment has been designed to be customizable and scalable, user is given an option to add more answer choices **800** other than what are provided in the app.

FIG. **9** shows a travel survey creation screen seeking group inputs on transportation choices. By clicking buttons, the UI element **900** changes color and passes data to the backend server that becomes a part of survey sent to invited members to vote on.

FIG. **10** depicts trip length options for travel survey creation. By clicking "Add more" button **1000**, user can add custom answers for group to vote on.

FIG. **11** depicts user interface elements used to customize the travel survey. After the user clicks "Add more" button **1000**, a text input user interface **1100** appears along with a keyboard to type in additional answer choice.

FIG. **12** depicts stay options to choose for travel survey creation.

FIG. **13** shows a variety of pre-built activities list that survey creator can pick from. At the end of activities screen, survey creator user is given an option to "Add more questions for group" **1300** which upon clicking gives user an ability to enter one or more survey questions and their answer choices. This feature makes the Travel survey fully customizable while saving significant time for users by picking pre-built question and answer choices.

FIG. **14** shows user interface for sending invitations to group members using email and phone numbers. Using GROTU app, a user can send invitations to worldwide phones by entering phone numbers with country codes and email addresses **1400** separated by spaces. Survey creator user can click on phone book icon **1410** that opens phone contacts from which user can pick emails and phone numbers to send invitations out. In order to simplify sending out invitations, GROTU provides an ability to search phone book by names and also displays a list of frequently invited contacts before listing out the phone contacts. If a user is registered user for GROTU app and has app downloaded on their phone, they receive a Push notification and Badge notification, but if they have never downloaded the app, they receive an SMS or email from user inviting them through their GROTU account.

FIG. **15** depicts travel survey result charts after invited group members vote using their GROTU app accounts on their mobile phones. Each survey responder adds their vote from their GROTU account and the backend database gets updated in real time, dynamically changing the survey charts as votes from invited users pour in. Users can also change their responses anytime and results will instantly reflect the change in charts.

FIG. **16** shows the user interface elements in GROTU app for creating a Potluck or Event invitation. Using a simple click, users can toggle between a Potluck style invitation **1600** or an event invitation **1610** the difference being that Potluck style invitation allows event creator user to specify a list of items that invited users can chose to bring to the event. User input **1620** lets invitation creator pick date and time using mobile phone's native date and time pickers.

FIG. **17** further shows the steps of Potluck event creation and initiation workflow. User can enter a list of Potluck items **1700** or shared responsibilities that invited users can sign up for.

FIG. **18** shows user interface and steps required of a group member to respond to a potluck invitation including items view and group chat. Invited user can click on GPS icon **1800** that gives user the ability to select which maps or directions apps they want to choose from installations on their phones including but not limited to Apple Maps,

Google maps, Waze etc. Further, while submitting their RSVP response for Potluck invitation, users can select from a list of items to bring **1810** and also see what other invited users are bringing **1820** to the event. GROTU allows users to chat with other invited users to an event or trip within these modules. This is an important feature of GROTU app as this chat **1830** is organized and focused on the event and happening between group members invited for this event, unlike chat apps where all sorts of news, jokes, talks are mixed up in daily chat volume.

FIG. **19** shows user interface and workflow to create a group expense report using GROTU app. An important feature of a feature rich app like GROTU is the ability of different modules to pass data between each other to save time for users. So after a trip or event is created and user decides to create an expense report or photo album for that trip or event, user can import all group members from the trip or event into expense report or photo album using single click on radio buttons **1900** provided, that invokes the drop down menu **1910** where a list of trips and events that user is part of appears. User can make this selection to invite members faster.

FIG. **20** depicts user experience within GROTU app as it relates to search, filter, edit, inviting additional users, accessing and deleting Expense reports or other records in app. GROTU allows searching and filtering **2000** records, and by clicking the 3-dot menu **2010** on records users have created themselves, a menu containing additional options to edit, delete or invite additional users **2020** pops up. Such advanced editing features are very user friendly as they provide the ability to edit invitations and invite additional friends because nobody is required to be perfect in creating and inviting the very first time.

FIG. **21** depicts user interface elements and workflow to add a new expense to group expense report. Expense report participants show up in a drop down menu **2100** to be selected based on who paid it, and to create an even split among expense participants, a radio button selection in end **2110** helps the app settle amounts between users. Users can use phone camera or photo roll to submit receipt **2120** for expense that GROTU maintains in cloud storage to be visible to all participants of that expense report.

FIG. **22** shows how an expense summary and settlements **2210** are displayed to all group members participating in the expense report. A list of expense entries **2200** is displayed with ability to view participants and receipts for each expense.

FIG. **23** depicts a group photo album where invited group members have contributed pictures **2300** and hyperlinks **2310** to any external storage site where they may have stored their trip photos. These photos are stored by GROTU app in Amazon S3 servers. Ability to store hyperlinks and pictures in same album ensures that all friends can contribute to an album regardless of which provider they chose to store their pictures with.

While the above description contains many specificities, these should not be construed as limitations on the scope of any embodiment, but as exemplifications of various embodiments thereof. Many other ramifications and variations are possible within the teachings of the various embodiments. For example, its possible to develop the GROTU mobile app for functioning on phones that are neither iOS nor Android, like smartphones running on Blackberry OS, Windows mobile etc. Also, another embodiment can be a web browser based application that can be accessed on popular web browsers like Chrome, Safari, Internet explorer, Firefox etc. on laptops, desktop and phones/tablets. It is also possible to add additional modules to GROTU app to add functionality that can help groups in travel and event planning. Also, we can alter, reduce or expand functionality of each module, like adding additional questions and answers to travel survey, increasing the number of event notifications app sends out to users and at what intervals, adding additional features to chat and adding chat to other modules where it's not available, supporting variety of media files other than images, processing payments through the app or integrating APIs of payment gateways, banks etc. with the app.

Thus the scope should be determined by the appended claims and their legal equivalents, and not by the examples given.

What is claimed is:

1. A method of managing group travel and events using mobile smartphone and computer applications comprising:

downloading and installing a mobile application on smartphones running on an operating system;

creating user accounts with unique identification that may include mobile phone number and email address to sign up users from around the world;

administering user accounts providing admin account holders the ability to analyze, disable or delete user accounts or user data;

providing a first user interface giving users an ability to invite other users using phone numbers or email addresses to collaborate in private groups using different functions of the mobile application;

creating private invite only networks to facilitate data and image exchanges between users using the internet;

creating and deleting virtual private networks based on user needs and functionality implemented in the mobile application;

processing and storing user data and images, by the mobile smart phone, using relational databases and cloud computing services;

providing a second user interface allowing users to:

create travel survey by picking from a list of questions and answers provided by the mobile application;

add additional answer choices and additional questions and answers to expand the scope of travel survey provided by the application;

respond to travel survey requests and view survey results;

send event invitations to other users via the application;

specify a list of potluck items or shared responsibilities for other invited user members to select from;

view the event invitation and respond with theft choices picking potluck items or shared tasks and view what other invited users have picked and what's still available for them to pick;

create a shared group expense report and invite other users to view expense summary and add expenses and specify the expense participants for each expense for enabling the application to calculate dues between members;

capturing expense receipt images, using mobile phone camera, and adding the receipt images captured by the camera or previously stored in a photo gallery;

maintaining a ledger balance with the photo receipts for expense reports in cloud storage;

providing a third user interface allowing users to:

create photo albums in cloud storage along with hyperlink storing and photo thumbnail displaying ability in each photo album;

invite other members to upload, download and share online links to photos in each gallery;

post comments and have discussions within group trips and events they are planning.

2. The method of claim 1, wherein a toggle switch or single click on radio button user interface can invoke software modules on the mobile application, that allow users to create potluck items list including specifying any shared responsibilities for event that a group of users are being invited to.

3. The method of claim 1, wherein mobile phone SMS, email, push notifications and badge notifications are used to invite and alert other users to privately participate in group travel surveys, group expense sharing, group photo albums and group events organizing.

4. The method of claim 1, wherein group members invited to an event or trip survey can be invited for an expense report or photo album by selecting from a menu providing a list of those events and trips.

5. The method of claim 1, wherein the mobile application displays charts including pie charts, bar charts and corresponding data to all group members invited to a travel survey.

6. The method of claim 1, wherein invited members to a group expense report are listed in expense addition menu for users to select expense payor as well as expense participants.

7. A system comprising computer hardware, software, internet web services, mobile smartphones, mobile operating systems, mobile applications, web applications, integrated software modules exchanging and processing data and images between users, providing group tools to help in managing group travel and events including but not limited to expandable group travel surveys, event invitations, group expense reports and group photo sharing modules, wherein the mobile smartphones include user interfaces allowing users to:

invite other users using numbers or email addresses to collaborate in private groups using different functions of the mobile application;

create private invite only networks to facilitate data and image exchanges between users using the internet;

create and delete virtual private networks based on user needs and functionality implemented in the mobile application;

create travel survey by picking from a list of questions and answers provided by the mobile application;

add additional answer choices and additional questions and answers to expand the scope of travel survey provided by the mobile application;

respond to travel survey requests and view survey results;

send event invitations to other users via the mobile application;

specify a list of potluck items or shared responsibilities for another invited user members to select from;

view the event invitation and respond with their choices picking potluck items or shared tasks and view what other invited users have picked and what's still available for them to pick;

create a shared group expense report and invite other users to view expense summary and add expenses and specify the expense participants for each expense for enabling the application to calculate dues between members;

create photo albums in cloud storage along with hyperlink storing and photo thumbnail displaying ability in each photo album;

invite other members to upload, download and share online links to photos in each gallery; and

post comments and have discussions within group trips and events they are planning.

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