

## ISUBS: Interactive System Using Bluetooth Scatternet

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**Abstract— Bluetooth is one of the most used technologies used in day today life which is easily feasible in Smartphone. Taking advantage of this technology we aim to develop a interactive system application that can connect people having similar interest but not having any previous acquaintance and perform corresponding actions. This enables us to incorporate a new form of interaction on mobile devices without using extra hardware and connecting to unknown people. Here we present a framework that describes our application which will increase the functionality of preexisting devices..**

**Keywords— Bluetooth, max matching, piconet, authentication, pairing, scatternet**

### I. INTRODUCTION

Smartphone has completely revolutionized the mobile phone industry in the last five years. Mostly touch-screen devices, they capitalize on human being's natural instinct to touch and feel. Smartphone has brought the world closer, providing one-touch access to all the information desired by the user. These phones are usually characterized by interactive interfaces and a superior user experience. Developers across the world are trying to further enhance this user experience. From text messaging to voice chat to video chat, the technology is ever-revolving. Research is going on to make user more comfortable with its day today interaction to various people. According to a 2012 census, 59% of the smart phones run on the Android platform. So, there is a need and possibility of an application that can further enhance user experience in Android smart phones and make it possible for users to interact users with Bluetooth. The purpose of this system is to develop an Android application for interaction between unknown people. By employing the Bluetooth that is already present in most of today's smart phones, we shall use a profile interest with the

help of max matching algorithm to detect similar interest user. As Bluetooth is more preferred and convenient for human beings and being connected to unknown user of similar hobbies, it is the main focus of this project. Also reducing overhead of processing authentication, response to pairing request, and to avoid the problems faced by the users are the driving forces for taking up this project [1][3]. User creates its profile including profile interest from the Smartphone's user interface. Profile interest and Bluetooth search will detect similar interested users are detected and then based on

its response for authentication the necessary action is initiated [2]. Our application can be easily integrated with

system applications like file manager, messaging and notes as well as opening new avenues for application developers.

### II. PROBLEM FORMULATION

*A. Problem Definition* – Given the performance of a dynamic profile by an actor the system should interpret that interest and send a command to a similar interest user to perform an associated task. Profile creation should be dynamic i.e. it should work in a variety of profile interests and with a wide array of interests.

*B. Problem Output* – The main objective of the ISUBS is to enable a new form of interaction in smart phones without adding hardware. The added functionality will enable connect two peoples unknown to each other of similar hobbies allow them to share their views etc. Inputs will be taken from the user interface i.e. profile creation. Profile interests are checked via Bluetooth in its vicinity. The request is sent to another user and based on response users will be in interaction mode.

## II. MATHEMATICAL MODELLING

We now provide a model of the system in terms of Set Theory domain. Let us consider  $S$  as a system for Bluetooth interactive system.  $S = \{M1, M2, M3, \dots\}$  Division of the system in modules is done according to the related functionalities. By considering this approach, main and basic four modules are  $M1$ ,  $M2$ ,  $M3$  and  $M4$ .

### A. Module $M1$

*Identify the inputs:*

$I = \{I1, I2, I3, \dots, In\}$  'I' inputs for the module}

I1: Instructions given by user

I2: Encryption keys

I3: Username details

I4: Profile interest

I5: Bluetooth device address identifier

I6: Recorded History

*Functions performed:*

Create ( $I3, I4$ ) = 'CR'; create function generates a new user profile containing user's basic information.

'CR' = {d | d' contains information about success/failure of creation of the profile}

Update ( $I3, I4, I6$ ) = 'UP'; update function allows changed to be saved to the user profile.

'UP' = {d | d' contains information about success/failure of updating of the profile}

Delete () = 'D'; delete functions removes the paired devices.

'D' = {d | d' contains information about success/failure of deletion of paired devices}}

*Output:*

$O = \{O1, O2, O3, \dots, On\}$  'O' output of operations performed by the system}

O1: Generated profile Constraint: If already, delete profile first.

O2: Updated profile Constraint: There should be a generated profile.

O2: Deleted profile Constraint: There should be a generated profile

### B. Module $M2$

*Identify the inputs:*

$I = \{I1, I2, I3, \dots, In\}$  'I' inputs for the module}

I1: Instructions given by user

I2: Encryption keys

I3: Generated profile

*Functions performed:*

Search ( $I2$ ) = 'S'; search is a function that search devices in vicinity.

'S' = {d | d' contains the information about success/failure of searching.

Notify ( $I3$ ) = 'N'; notify is a function that notifies the devices

'N' = {d | d' contains the information about success/failure of notifying nearby device}

Pair ( $I2$ ) = 'PR'; pair is a function that is used to pair two mobile device

'PR' = {d | d' contains the information about paired devices}

*Output:*

$O = \{O1, O2, O3, \dots, On\}$  'O' output of operations performed by the system}

O1: Displays available visible Bluetooth devices. Constraint: Bluetooth visibility must not be hidden.

O2: Displays the prompt on the device. Constraint: Profile interest should be same.

O3: Make a bond between two devices. Constraint: Both devices must have same keys.

### C. Module $M3$

*Identify the inputs:*

$I = \{I1, I2, I3, \dots, In\}$  'I' inputs for the module}

I1: Generated profile

I2: Bluetooth device address identifier

*Functions performed:*

Authenticate ( $I1$ ) = 'A'; verifies the username and profile interest (via Bluetooth)

'A' = {d | d' contains the information about success/failure of authentication}

Track () = 'T'; track is a gives the record of data transfer in a single interaction.

'T' = {d | d' contains the success/failure of recording information about transfers}

History () = 'H'; history function displays the records of previous interactions.

'H' = {d | d' contains information about the last interactions}

*Output:*

$O = \{O1, O2, O3, \dots, On\}$  'O' output of operations performed by the system}

O1: Allows data transfer over a time transaction Constraint: Both devices should response the request.

O2: Records data transfer activities.

O3: Shows earlier recorded data transfer activities.

### D. Module $M4$

*Identify the inputs:*

I= {I1, I2, I3 ,..., In| 'I' inputs for the module}  
 I1: Bluetooth device address identifier

#### Functions performed:

share (I1) = 'SH'; share is a function that is used to share the data between two authenticated paired devices.

'SH' = {d | 'd' contains the information about data sharing} chat (I1) = 'C'; chat is a function that enables users to communicate using text messages.

'C' = {d | 'd' contains the information about successful/failed communication through messages}

Port (I1) = 'PO'; port is a function that imports the data file systems.

'PO' = {d | 'd' contains the information about success/failure of importing the data file system to another device}

#### Output:

O= {O1, O2, O3..., On | 'O' output of operations performed by the system}

O1: Available database displayed on other device.

O2: Data transfer

O3: Communicate through text messages

Initial condition for interaction- There should be same Bluetooth technologies on the both devices for better interaction i.e. Bluetooth device address identifier (I1). There is no initial condition for profile creation.

### IV. FRAMEWORK

The basic framework for interaction between two similar profiles consists of 3 main phases:

#### A. Phase 1

(Receive profile interest) receives the user profile. Out of that profile interest is extracted before sending it to the next phase.

#### B. Phase

(Process interests) processes those interests that are found via Bluetooth in the vicinity to recognize and interpret interested user from the given input for connection request.

#### C. Phase 3

and based on that take the necessary steps to complete the request spec(Perform Action) receives the response of the authentication in field.

### V. EXPECTED RESULT

The expected result will be the successful interaction with a similar interest user with a relatively high probability in a variety of profile interests.

### VI. CONCLUSION

Thus we have presented a framework for interaction via

Bluetooth between unknown ones using smart phones. We have also described the Mathematical Model for the same.

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