Interruption Management for Smartphones
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Introduction

While interruptions are a common part of life, it is not uncommon for an interruption to be unwanted. Due to the burden interruptions can cause, a good amount of research has been done on the topic.
- From this research has emerged the concept of Cost of Interruption, or COI. COI looks to mathematically determine the cost an interruption has on an individual.
- Probability of Interruption, or POI, is the probability an individual would want an interruption, indicating a low COI.
- We look to prevent unwanted cell phone interruptions by measuring POI with whether on Smartphones.

Motivation

Cell phones provide extremely valuable services, but by their nature they have a serious flaw: unnecessary interruptions. These interruptions can often have high costs to users and to society. Examples include:
- Businesses losing billions of dollars each year due to employee distraction
- Students not learning due to an interrupted educational environment
- Distracted drivers on the roads

Unnecessary or untimely cell phone interruptions can have large negative impacts that can potentially be eliminated.

The Goal

The main goal of this research is to produce the first widely available interruption management application that utilizes a probabilistic method.
- The advantage of a probabilistic model over binary decisions is not having the user predetermine every possible outcome.

Acknowledgements

Similar Applications

Name	Platform	Schedule/ Time of Day	Contact	Location	Driving
Auto Ring	Android		X		
Auto Silence	Android	X			
AutoSilent	iOS	X		X	
AutoSilent	Android	X			
Busy Me	Android	X			
Husher	Android	X			
Llama	Android	X	X	X	
PhoneGuard	Android				X
Ring Scheduler	Android	X	X		
Selective Silence	Android		X		
Silence	Android	X			
Silencify	Android	X	X		
Silent Driver	Android				X
Silent Sleep	Android	X			
Smart Silencer	Android	X	X		
Smart Silent Beta	Android		X		
Smart Volume Profile Manager	Android	X		X	
SuperSmartPhone	Android	X			
Tasker	Android	X	X	X	
TextArrest	Android	X			
Timeriffic	Android	X			
Our Application	**Android**	**X**	**X**	**X**	**X**

Our app looks to incorporate all the common components of these applications and evaluate the components with a probabilistic method.

The Model

- We used a weighted sum for a basic model. The model incorporates 5 contexts: location, schedule, contact, time of day, and driving.
- When evaluated on some test scenarios it produced the intended result on 12 of the 15 scenarios.

$$P(I) = P(I)_L * W_L + P(I)_S * W_S + P(I)_C * W_C + P(I)_T * W_T + P(I)_D * W_D$$

- P(I)=Probability of interruption
- $P(I)_{\{L,S,C,T,D\}}$=Probability of interruption based on location, schedule, contact, time of day, and driving
- $W_{\{L,S,C,T,D\}}$=Weight of location, schedule, contact, time of day and driving
- The weights must sum to one
- If the context isn't measurable, a default P(I) of 0.5 is assigned
- P(I) for each contexts must be between 0 and 1
- P(I)>0.5 suggests interruption

Application System Flow
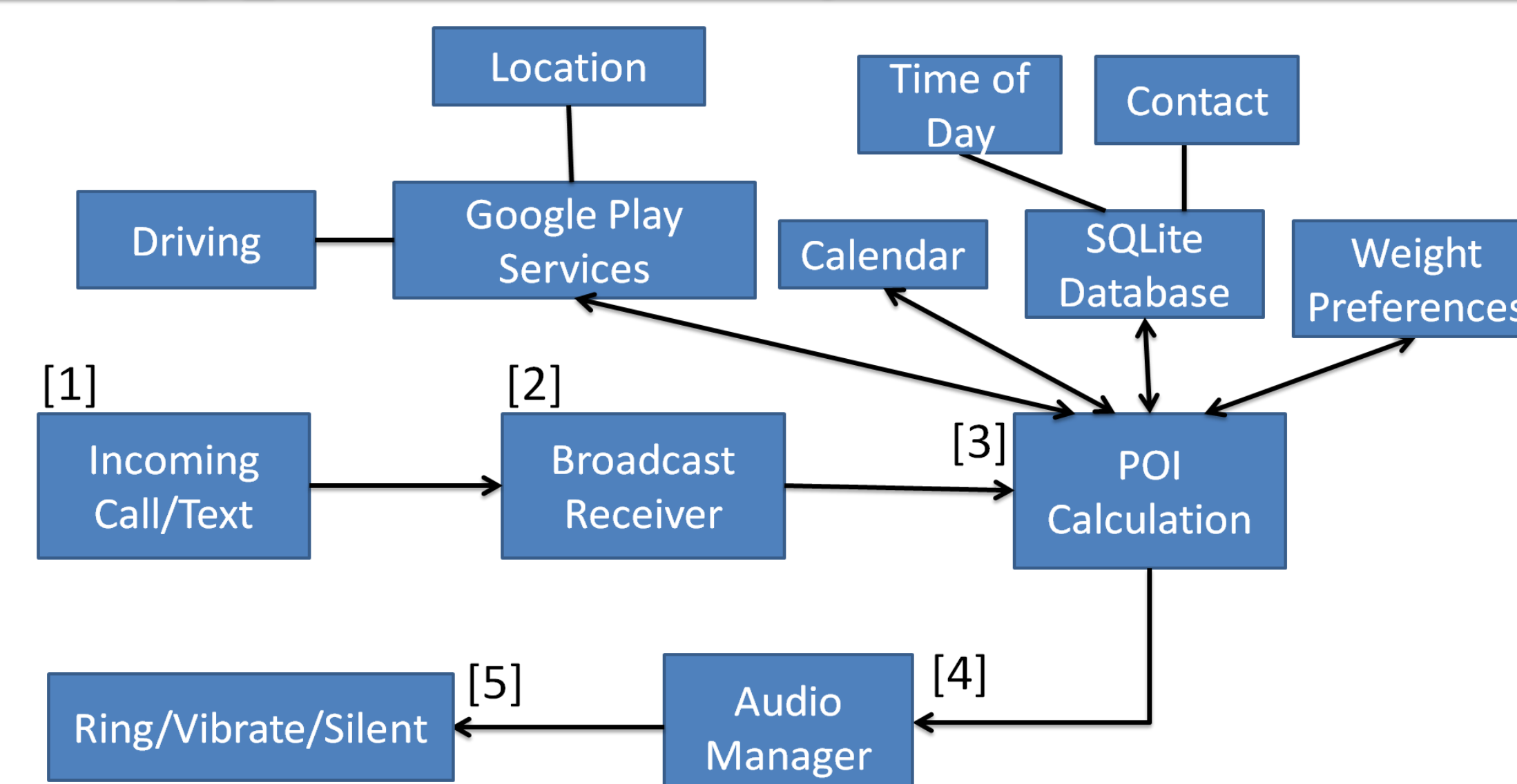
Prototype

- Implemented a bare bones application on the Android platform for devices running Android 4.0 and higher
- Testing was done on a Sony Xperia U. Before public release more testing will need to be done, as well as changes to the overall aesthetics.
- Average execution time of the application was 0.153 seconds.
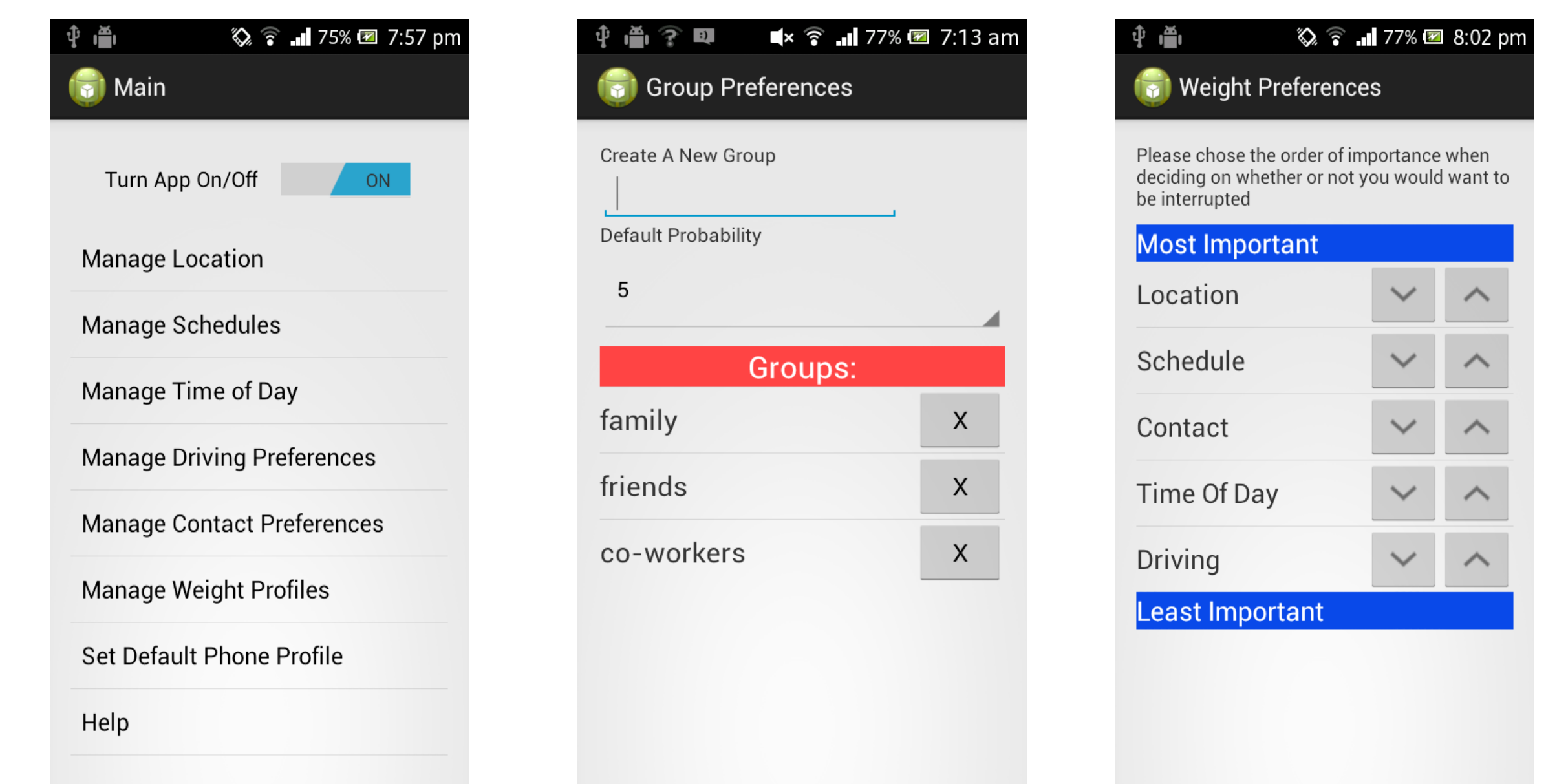
Conclusion

- Significant progress has been made on an application that intelligently manages the interruption profile of a user's phone to prevent unnecessary interruptions.
- The implementation of this application has provided insight into the current limitations of this method, as well as other COI models and modern day technology.

Future Research

- Completion of this application and its publication. This can lead to user feedback that can determine its effectiveness and provide useful insight.
- A comparison of this method with the other COI models.
- How to determine probability of interruption for each context without relying on constant input from the user.
- Implementation of machine learning to better adapt the application to each user.
- Looking beyond the scope of Smartphones, COI models can be implemented on other context aware devices, such as tablets and laptops.