Parking guidance system using WSN.

The purpose of this project is develop a system that can guide incoming vehicles through a shortest path from the entry to a vacant parking slot inside a large parking area. You can assume that incoming cars are fitted with sensors that can be activated when a car approaches the entry gate The information concerning presence and movement of a car then flows to sensor located on the parking bay. This information can be used by to guide the incoming car to vacant parking slot via a shortest path. We have some sensor hardware for sensing presence and vibration, as well as multiprotocol routers. You are encouraged to use these equipment to demonstrate in-field deployable capabilities of your system.

Sensor based wireless signal measurement systems for a building

The idea is to come up with practical design through which it will be possible to measure the strength of wireless signals spilling out from a building. The motivation for this project is that information about signal spill out can be used as feedback to a system for placement of wireless access points for a LAN setup inside the building. You need to come up with an innovative design whereby it would be possible to choose and pick places where APs can be placed and application would then be able to show the places where signal spills out.

Vehicular network for incremental route planning and avoiding traffic congestion

Planning of city transport network is alway challenging. Basic purpose is to utilize fleet optimally and increase revenue. In city traffic condition may have a regular periodic pattern. But at time it becomes unpredictable due to political rallies, protests or also due to shoppers, festival, etc. You should design a framework through which vehicles on the road maintain a transient network and inform one another about traffic conditions on certain roads. Using this information vehicles may avoid or reroute adaptively. You may assume that vehicle have either access to route map of city or use google maps.

Sensor application for oil spill

Large oil tanker carrying crude sometime meet accident and create large oil spill which endanger the marine life. The major challenge when such a spill is created, is to ensure that spill does not spread much before cleaning and salvage operation can be completed. In fact, if a spill occur we can do very little except rescue some marine life. In order to help in this operation, keeping track of spill contour on the sea is important. Sensor can be used to construct the contour and watch how it changes over time with drift. The objective of this project is propose algorithms, simulate the drift through a realistic modeling of air flow and spreading of spill. Simulate the entire system possibly using Matlab.

Localization of sensors

Sensors send environmental data. Data becomes meaningful if the location from where the data is fetched is known. So, sensor localization is an important initial step for sensor application. One simple way to solve this problem would be pre-load the position into sensor before deployment. Unfortunately, pre-loading location is not always possible as sensors may be dropped from air. Also if the sensor is attached to collar of animal or mounted on a vehicle, its location will change with time. To handle such situation, localization is important. The aim of this project is to study some of well known and widely used localization techniques, simulate and compare them. If you can come up with newer and less expensive localization technique then it will be even better.

Tool for simulation of handoff algorithms

Handoff is a major component which provides mobility in mobile networks. Different approaches are possible to tackle handoffs. A decision for handoff is primarily influenced by measurements of signal strengths between MSs and base stations. But there are numerous methods for performing handoffs depending on state information defined for mobile terminal and the networks. Naturally, a plethora of handoff schemes have been proposed and experimented. It becomes a challenging task to recommend a handoff scheme a service provider would use. So, the idea here is develop a simulation tool which will allow one to experiment with different handoff schemes. The tool

should allow user to look at different performance parameters, also depict the handoff through animation. Your platform should be such that new handoff algorithms can be easily plugged in and analyzed.

Summarized databases for imprecise resolution of queries

Traditional database systems have been designed to provide correct (i.e. sound and complete) answers for database queries. But in wireless computing environment it is neither practical nor necessary to adhere to such a stringent requirement. In a mobile computing environment, characteristics such as availability, connectivity, low-band width, data quality, usage cost and query imprecision impose new constraints on database systems. In such a computing environment, users may not obtain perfect answers to their queries within an acceptable time. However, within known limits of correctness and precision, an approximate answer may suffice for some mobile users to make perfect or near perfect guesses for right answers.

Android application for local weather updates using sensors

Sensors can sense temperature, humidity and pressure. Using such environmental data it is possible to computer other related weather parameter such as windchill factor. Design a wether update system for the campus using sensor data. Sensors can be placed selected places inside campus (airstrip, hostel, residential area, etc). Your application should be able to display weather updates using android based handheld like Aakash tablet inside the campus. The project would involve extracting weather related parameters and position (lat, long) from sensors which can be sent to a Weather Server as JOSN objects. A JOSN object is a tuple consisting of string and value. Weather Server processes these JOSN objects and updates tablet display through the application either when the user triggers the update or auto update in the application is turned on.

Context aware application on androids

One of the components of pervasive computing is Context Awareness. For example, when a mobile device moves from one network to another, it is desirable that the device senses the nature of its host network (i.e, acquiring the

context) and reacting to any changes (like reconfiguring the security settings to cater to the application/user requirements). The parameters that constitute a context is very broad, and included things from physical conditions of the surroundings to social/emotional state of the user. There is an android application AIRS available from Google Play which allows to access large number of internal sensors of a android device. Using AIRS (android remote sensing) design a context capturing system. Using the context capturing system develop an innovative application which can organize and automate user's interaction with android device.

Formal modelling of mobile computation

Formal modelling is a popular technique used by researchers to express the capabilities of systems that they design, and also prove certain properties about them. This gives a very easy mechanism to verify the validity of the system, even before its actual implementation. There have been some research in this area as well as its parallel field of asynchronous distributed systems, and the aim of this project would be:-

- Study the formal models developed to describe asynchronous distributed systems, and show the suitability or the lack thereof of these models to describe the behaviour of mobile systems. In the first case, you would also be required to either prove that there is no need for specifically modelling mobile systems or to reason about inadequacy of those models for Mobile systems.
- Either propose new model or changes/extensions to the existing models of distributed systems so that the behaviour of Mobile systems can be modeled in easy and comprehensive manner.

Transient social networking on mobile system

The main objective of this proposal is to address the systems challenges for the realization of effective social computing systems using transient social networks. A transient social network is defined as a mobile community in which concurrent connectivity is between dozens of co-located nodes engaging in social activities. The fundamental challenge concerns research into the system support for the creation, management, and coordination of activities between entities in such transient social networks. Creating and

maintaining viable transient social communities requires solving a number of significant challenges up and down the software stack from programming model to efficient energy-conscious communication protocols. It also includes challenges in managing the dynamically created social graph, context management among the participants of the transient social graph, maintaining connectivity across heterogeneous nodes and interfaces and efficient message delivery among the nodes in a community.

Android as mouse and presenter

Write an androd application which can be used wireless touch pad for a computer. Apart from providing touch pad functionalities it should provide some more additional functionalities. These may include for example, replacing a line text. You can keep provision for a text window in the android. User can write some text in this window and transfer to a chosen position of edit window in the computer. Think of other innovations that can make the android dvice as a wirelss presenter and demo system apart from controlling touch pad.

Android wallet

The idea is to develop a generic electronic wallet app for android. Typically, many Internet shopping providers maintain electronic wallets for the accounts of customers. Customers can pre-charge these wallets by transfering money from bank accounts. However, it is not a very ideal way of maintaining idle money. Think of maintaining wallets with flipkart, snapdeal, indiaplaza, infibeam, etc. You end up in having idle money in each wallet and losing out. The other way is to generate a netcard from your bank to make a purchase. However, it is a two step process. So, can you come up with an app which runs in your android phone and perhaps let you generates netcard concurrently as you shop with flipkart, or other internet shopping sites.

Framework for asymmetric computation

Due to resource problem, mobile devices try to delegate computation intensive jobs to back end servers. So mobile computing system present a platform for asymmetric computation involving mobile devices and back end servers. The idea of this project is to come up with a framework that will try to

delegate compute intensive tasks to backend servers. The idea here is to use mobile device as a front end to computation. Most computation tasks are delegated to fixed nodes. The given computation task can be fragmented in terms of many remote procedure calls and distributed among servers best suited to execute these calls. There is a cost angle to distribution of tasks. You should optimize this as well.

Location based notification/alert service

Alarms and reminders are time dependent services. The aim of this project is to develop a spatio-temportal notification service for smart phones. The idea is if your location is home and time is 9.00PM then the proposed notification system would remind you to check mail. It should be possible to generate notification items from calendar and other reminder service you generally find in android phone. Essentially the aim is to build a multidimensional notification system. Try to provide some innovative features in generation, posting and visualization in your system so that it appears distinct from other similar existing notification service systems. You should first design a generic event notification system and then build a specialize notification on the top of this event notification system.

Library catalogue query service on tablet

IITK library has online report repository and catalogue searching system. The idea of this project is to make the service available through akash tablet. Here the major work will be in innovation of forms for making the search mobile friendly. For example, originally the catalogue information concerning books are filed in form of a catalogue card (catcard). These catcards or index card are organized into array of boxes where each box houses index card for certain alphabet. User can see the card and find the library shelf where the book can be found. A catcard based searching can be implemented for android device (specially akash). Simiarly, the report repository can also be serached. The innovation in this project is limited to visualizing catcard and search forms and presenting them to user, and also present the results of query.

Data traffic offloading

Mobile network experience choking and other latency related problems when high volume data such multimedia, newspapers, weather forecast etc which are typically generated be content providers. Mobile service providers can offload data traffic by following a techniques quite similar to torrent approach. Initially server disseminates information to few subscribers. Other subscribers can get updates through their social participation when mobile phones are within transmission range of each other and they can communicate opportunistically provided the subscribers have registered for the service. A charge and discount policy can be used to allow subscribers reduce their data bill while service provider manages to reduce pressure of data traffic.