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Personal Environment Impact Report

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Center for Embedded Networked Sensing

PERSONAL ENVIRONMENTAL IMPACT REPORT

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Urban Sensing, CENS – http://urban.cens.ucla.edu/ with support from Nokia

Intro: Understanding personal environmental impact through time-location information

What if we had a constantly updated assessment
of our own relationship with the environment around us?

PEIR explores how models of environmental exposure and impact can be applied to individual location traces to show us the effects of lifestyle choices that we make every day.

This is the personal, real-time equivalent of government-mandated Environmental Impact Reports and Health Impact Assessments, PEIR is being designed to reveal these invisible interactions on a daily basis.
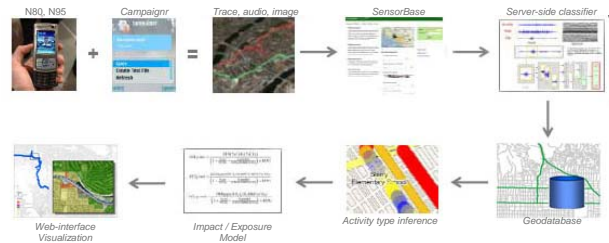
Problem Description: Infer and represent environmental impact and exposure

Automated Inference and Geospatial Processing

– Creating a scalable system design for annotating location data streams with inference/classification, geoprocessing of models, and visualization.

– Use individual time-series location data to index into existing datasets and models, rather than relying on aggregates across many participants.

Effective User Interfaces

– Visualization of daily, weekly, monthly trends and social context that encourage reflection, comparison, and exploration.

– Representation through a personal travel diary. How to represent impact (e.g., automobile emissions & carbon footprint) and exposure (prox. to fast food and high traffic volume on roadways).
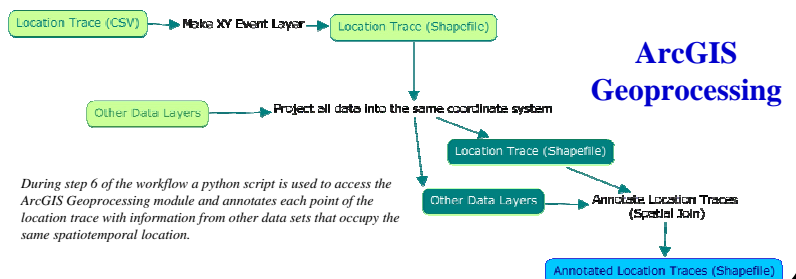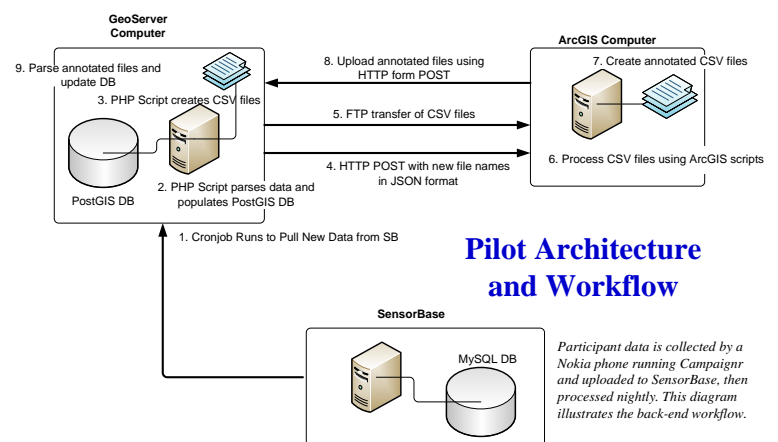
Selective Sharing and Informed Consent

– Privacy concerns of identity inference from travel patterns are addressed through informed consent, personal data stores, and user-controlled selective sharing.

– How to effectively communicate risks and options to mitigate those risks to PEIR users?

–Constructing a form that presents the costs, benefits, risks, responsibilities and privacy issues associated with campaign participation. In what format will consent be given (i.e. electronic, hard copy, verbal)?

Problem Solution: Understanding impact & exposure through time location information

Representation

For Example, participant location data is compared with current zoning to determine how much time a person spends in a particular land use.

Percentage of Time Spent in each Land Use Type (Gaps of 30 Min)

Land Use Zoning District

Summer '07 Technical Feasibility Pilots

• Request for campaign participants within CENS and collaborators.

• After informed consent, mobile phones and GPS receivers are distributed. (To ensure participants are aware of privacy concerns with location data, a signed hard copy of the consent form is required for each participant).

• Location data is collected autonomously with Campaignr and sent to SensorBase.

• Each night, the location data is run through the post-processing workflow shown below.

• The annotated location trace is then sent to a web interface .

Pilot Architecture and Workflow

Participant data is collected by a Nokia phone running Campaignr and uploaded to SensorBase, then processed nightly. This diagram illustrates the back-end workflow.

ArcGIS Geoprocessing

During step 6 of the workflow a python script is used to access the ArcGIS Geoprocessing module and annotates each point of the location trace with information from other data sets that occupy the same spatiotemporal location.

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