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Thesis Synopsis

Title: Modeling Mobile Web Characteristics for Energy Optimized Delivery

As mobile traffic and data consumption continues to rise, there is a growing need to investigate increased energy efficiency and optimizations to help reduce the bandwidth when browsing the mobile web. To determine the reduction in energy of implemented optimizations, there is also a need for a way to measure the energy consumption of mobile devices. By investigating the composition and characteristics of mobile web pages, statistical models can be derived for describing the characteristics of a typical mobile web page, such as the individual response size and expiration age of responses that mobile browsers request for web pages. HTTP Archive is one such tool that provides an enormous pool of data covering mobile web characteristics for the most popular desktop and mobile websites. HTTP Archive will be a great source of data that may be utilized to derive models for describing the mobile web. Additionally, this pool of data is updated on a bimonthly basis, providing a constantly updated pool of data to update the developed models with and validate them. These models can then in turn be used to provide more accurate results when estimating the possible energy and bandwidth savings by using these models for generating artificial webpages that will contain characteristics that closely resemble those characteristics often found on the actual mobile web. Investigating the models and data further, they can be extended to create prediction models that will describe the growing mobile web for future years. With these models in place, they can be applied to projects for optimizing energy and bandwidth consumption on mobile devices, such as the possible energy and bandwidth savings that can result from cache forwarding between desktop computers and mobile devices. To measure the possible energy consumption savings from these projects, a low cost test bed for measuring the power consumption of mobile devices can be employed as a baseline. The measurement data experimentally determined can be used for follow-up performance analyses.