arities to the same comparisons made by a machine.

3. The third objective is to clarify aspects of forensic transcription of speech. Different techniques may be used properly depending on the question from a client. First, a well-known technique using automatic speech recognition applied to forensic transcription and automatic alignment is presented. In case there is a part of a recording under scrutiny, this should be treated as a disputed utterance. This means a different way to approach the problem, which will be presented here.

4. A final fourth objective was to adapt and develop tools and databases to be used in a forensic phonetic analyst’s environment.

1.3 Major Research Questions

1.3.1 The concept robustness

The main concept of this thesis is robustness. Ploughing one’s way through references there are several gaps to be filled especially when it comes to robustness of forensic speaker comparison parameters. In the thesis several aspects of the robustness of analysis parameters used in forensic phonetics will
be investigated. The concept of robustness will here be used to mean mainly resistance to noise.

The concept noise

From an engineer’s perspective, noise often refers only to environmental noise, such as in noisy recordings (Reynolds et al., 2000; Kimura et al., 2004; Nakasone and Beck, 2001;
or mismatched recordings, i.e. recordings made on different recording media (Alexander et al. 2005). All this is what is referred to as noise here. However, noise affecting parameter values conveying variation in phonetic and linguistic studies can also be given a wider definition. Between-speaker variation in perceptual studies, for example, may also be seen as noise affecting robustness (Clopper and Pisoni 2004). So can within-speaker variation due to changes in the speaker’s emotional state (Doherty and Hollien, 1978), speech liveliness (Traummüller and Eriksson, 1995b) or level of vocal effort (Jessen et al., 2005). This wider definition is also used here.

The concept robustness and noise

There are patents covering robust speaker recognition or “robust pattern recognition”, where robustness is not explicitly defined (Pilz 2006). In forensic speaker comparison the concept of robustness is used in conjunction with methodology (Drygajlo et al., 2003; Gomez et al., 2007). Robust statistics have several different definitions depending on whether one applies a frequentist or Bayesian approach, i.e. depending on the choice between probabilistic or non-probabilistic methods (Huber and Ronchetti, 2009). The concept of robustness is often used in speaker comparison contexts when referring to the discriminative power of a parameter (Gomez et al., 2007;