**Advancing Human and Machine Language Processing Research**

Vesa Mollakuqe1, Zonara Telaku2, Ziza Cadraku3

*Mother Teresa University, Skopje, North Macedonia, vesa\_mollakuqe@hotmail.com1*

*UBT Technology, Faculty of Social Science, Pristina, Kosovo zm46658@unt-uni.net 2,*

*NGO Lorddian, Department of Research, Pristina, Kosovo, zizacardraku@gmail.com3*

Abstract

This study presents a novel approach to multilingual eye-tracking data collection, aimed at advancing research in both human language processing and machine language understanding. As globalization increases linguistic diversity, understanding how individuals from varied linguistic backgrounds process language becomes crucial for both cognitive science and artificial intelligence. Our research utilizes cutting-edge eye-tracking technology to capture detailed eye movement patterns while participants engage with multilingual stimuli, such as written text and spoken language.

By analyzing these eye-tracking metrics, we aim to uncover the cognitive strategies employed by speakers of different languages when processing multilingual input. This includes examining aspects such as reading time, fixation duration, and saccadic movements, which reveal the underlying mechanisms of language comprehension. Our methodology also addresses the challenges associated with traditional language processing research, which often relies on limited linguistic samples or monolingual contexts.

Additionally, the insights gained from this eye-tracking data can inform the development of machine learning algorithms for natural language processing. By understanding how humans navigate multilingual environments, we can enhance machine models to better replicate human-like language understanding, improving applications such as translation services, language learning tools, and conversational agents.

Our findings are expected to foster interdisciplinary collaboration and innovation, ultimately bridging the gap between human cognitive processes and artificial intelligence systems in language processing.

**Keywords:** Language processing, eye-tracking, cognitive science, machine learning