



D6.5 Pre-Compensation of Induction Effects



| | |
|--------------------------------------|--|
| Grant Agreement nr | 761544 |
| Project acronym | HDR4EU |
| Project start date (duration) | July 1st 2017 (36 months) |
| Document due: | 30 th July 2019 |
| Actual delivery date | 28 th July 2019 |
| Leader | UPF |
| Reply to | marcelo.bertalmio@upf.edu |
| Document status | Submission Version |

Project funded by H2020 from the European Commission

| | |
|--------------------------------------|--|
| Project ref. no. | 761544 |
| Project acronym | HDR4EU |
| Project full title | Enabling End-to-End HDR Ecosystem |
| Document name | D6.5 Pre-Compensation of Induction Effects |
| Security (distribution level) | Confidential |
| Contractual date of delivery | 30 th July 2019 |
| Actual date of delivery | 28 th July 2019 |
| Deliverable name | Pre-Compensation of Induction Effects |
| Type | Report |
| Status & version | Submission Version |
| Number of pages | 13 |
| WP / Task responsible | UPF |
| Other contributors | - |
| Author(s) | Trevor Canham, Elise Mathieu, Javier Vazquez Corral, Marcelo Bertalmio |
| EC Project Officer | Mr. Rapolas Lakavicius, Rapolas.LAKAVICIUS@ec.europa.eu |
| Abstract | In this work, classical experiments about brightness induction are updated for the context of emissive displays in a dark surround reference environment and the correction model is re-optimized to fit the data. |
| Keywords | Brightness induction, contrast, color appearance |
| Sent to peer reviewer | Yes |
| Peer review completed | Yes |
| Circulated to partners | No |
| Read by partners | No |
| Mgt. Board approval | No |

Document History

| Version and date | Reason for Change |
|------------------|---|
| 1.0 15-05-2019 | Document created by Trevor Canham |
| 1.1 20-06-2019 | Version for internal peer review |
| 1.2 28-06-2019 | Revisions in response to review: final versions submitted to Commission |

Table of Contents

| | | |
|-----|------------------------|----|
| 1 | EXECUTIVE SUMMARY | 4 |
| 2 | INTRODUCTION | 4 |
| 3 | BACKGROUND | 5 |
| 4 | METHODS | 7 |
| 4.1 | Stimulus Overview | 7 |
| 4.2 | Laboratory Setup | 8 |
| 4.3 | Procedure | 8 |
| 5 | RESULTS | 8 |
| 6 | MODEL FORMULATION | 9 |
| 7 | DISCUSSION/FUTURE WORK | 11 |
| 8 | REFERENCES | 12 |

1 EXECUTIVE SUMMARY

Displays with varying screen sizes and viewing angles (cinema, 8k and 4k television, mobile) may cause image appearance to stray from what was seen on the mastering display via various perceptual effects. Among the potential factors is brightness induction. This is an illusion in which an observer's perception of a given object's color appearance (particularly lightness or hue) can shift towards or away from that of the object's direct surroundings. Physiological explanations for this include pooling within various early stages of visual processing as well as higher order psychological effects like grouping. While this phenomenon was previously considered to be in large part caused by higher order (psychological) effects, updated retinal models which have identified an extra-classical inhibition component in retinal receptive fields suggest that the effect may occur in the initial stage of visual processing. Using these models, a method was developed by Bertalmío and Kim for pre-compensating images intended to be viewed at different sizes such that the appearance disparity between them caused by this phenomenon is reduced. The model was optimized to fit classical brightness induction data from Helson. In this work, these classical experiments are updated for the context of emissive displays in a dark surround reference environment and the correction model is re-optimized to fit the data.