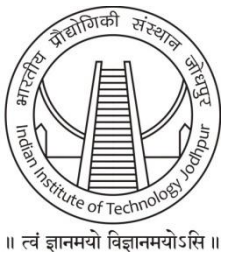
Feature Binding in Working Memory

A thesis submitted by

Anuj Kumar Bharti

in partial fulfillment of the requirements for the award of the degree of

Doctor of Philosophy



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Electrical Engineering

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Declaration

I hereby declare that the work presented in this thesis titled, "*Feature binding in working memory*" submitted to the Indian Institute of Technology Jodhpur in partial fulfillment of the requirements for the award of the degree of Doctor of Philosophy, is a bona fide record of the research work carried out under the supervision of Dr. Sandeep Kumar Yadav. The contents of this thesis in full or in parts, have not been submitted to, and will not be submitted by me to, any other institute or university in India or abroad for the award of any degree or diploma.

Anuj Kumar Bharti

Certificate

This is to certify that the thesis titled, “Feature binding in working memory”, submitted by Anuj Kumar Bharti [PG201384003] to the Indian Institute of Technology Jodhpur for the award of the degree of Doctor of Philosophy, is a bona fide record of the research work done by him under my supervision. To the best of my knowledge, the content of this report, in full or in parts, have not been submitted to any other Institute or University for the award of any degree or diploma.

Sandeep Kumar Yadav

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Anuj Kumar Bharti

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List of Abbreviations

ABBREVIATION	FULL FORM
ANOVA	Analysis of Variance
BOLD	Blood Oxygen Level Dependent
CDA	Contralateral Delayed Activity
EEG	Electroencephalogram
fMRI	Functional Magnetic Resonance Imaging
FOV	Field of View
INR	Indian Rupee
IPL	Intra Parietal Lobule
IPS	Intra Parietal Sulcus
ISI	Inter Stimulus Interval
IT	Inferior Temporal
JASP	Jeffrey's Amazing Statistics Program
L-FFG	Left Fusiform Gyrus
LGN	Lateral Geniculate Nucleus
L-IFG	Left Inferior Frontal Gyrus
L-IOG	Left Inferior Occipital Gyrus
L-MFG	Left Middle Frontal Gyrus
L-MOG	Left Middle Occipital Gyrus
L-SPL	Left Superior Parietal Lobule
LTM	Long Term Memory
LTP	Long Term Potentiation
MEG	Magneto Encephalography
MFG	Middle Frontal Gyrus
MOG	Middle Occipital Gyrus
MPRAGE	Magnetization-prepared rapid gradient echo sequence
ms	milliseconds
MT	Middle Temporal Visual Area
MTL	Medial Temporal Lobe
PCG	Precentral Gyrus
PET	Positron Emission Tomography
PPC	Posterior Parietal Cortex

R-Ant. Insula	Right Anterior Insula
R-FFG	Right Fusiform Gyrus
R-IPL	Right Inferior Parietal Lobule
R-ITG	Right Inferior Temporal Gyrus
ROI	Region[s] of Interest
R-SFG	Right Superior Frontal Gyrus
R-SPL	Right Superior Parietal Lobule
RSVP	Rapid Serial Visual Processing
RT	Response Time
sec(s)	second(s)
SEQR	Sequential presentation with Random locations
SEQU	Sequential presentation with Unchanged locations
SIMR	Simultaneous presentation with Random locations
SIMU	Simultaneous presentation with Unchanged locations
SMA	Supplementary Motor Area
SPM	Statistical Parametric Mapping
STM	Short Term Memory
T1	Timing of radio frequency pulse sequence, which highlights fat issues
T2	Timing of radio frequency pulse sequence, which highlights fat and water
TE	Echo time
TEO	Posterior part of the Infero-temporal Cortex
TMS	Trans cranial Magnetic Stimulation
TR	Repetition time
V1	Visual Area 1
V2	Visual Area 2
V3	Visual Area 3
V4	Visual Area 4
VSTM	Visual Short Term Memory; a limited capacity store, receiving input from basic perceptual processes for further transfer to other higher order processes such as long term memory. In this work, it is considered as one aspect of VWM
VWM	Visual Working Memory; implies continuous storage [maybe in multiple stores] as well as processing of visual material, to enable the eventual response as an output.
WM	Working Memory; implies continuous storage [maybe in multiple stores] as well as processing to enable the eventual response as an output.