1. Introduction
There is a script called ‘Goyakanadi’ or ‘Kandevi’ (Devanāgarī: गोयकानडी/ काण्डेवी, Kannada: ಗೋಯಕಾಣಡಿ/ಕಾಣ್ಡೆವಿ) that is reported to have been used by the Konkani community from the 16th-19th century. It was used for writing Konkani (ISO 639:gom & ISO 639-3) and Goan Marathi (ISO 639-2). Devanagari is now the regular script to write Konkani. The purpose of this document is to bring to the notice of the Unicode Technical Committee (UTC), the Goyakanadi script which was used by the Konkani community.

2. Background
Konkani is a language spoken by Two and a half million people in the western coast of India in the states of Goa,
Karnataka, Kerala and Maharashtra\textsuperscript{1}. It belongs to the south-western group of the Indo-aryan language family closely allied to Marathi and Gujarati. It is recognised as the State Language of the state of Goa and a minority language in the states of Karnataka, Kerala and Maharashtra\textsuperscript{2}. The Goyakanadi script is known indigenously as ‘Kāṇḍēvi’ which means ‘brought by the Kannadas (Kadambas)’. This name was also used by the Portuguese missionaries who studied the script. The name ‘Goyakanadi’ is an exonym used by Marathi speakers to refer to the script wherein ‘Goy’ means Goa and ‘kanadi’ refers to its kadamba origins. This name was popularised by Gajanana Ghantkar in his research book - History of Goa through the Gōykanadi script. This script was developed from the Local variety of the Kadamba script in 11th -15th centuries and was continued to be used till the late 19th century\textsuperscript{3}. Lack of recognition and Standardisation has left the script in neglect by native Konkanis themselves. Limited recognition has come in the recent years but due to the Digraphic situation of Konkani language no serious work has been done on it\textsuperscript{4}. The scope of Goyakanadi script seems to be limited for now.

\textsuperscript{1} https://censusindia.gov.in/2011Census/Language-2011/Statement-1.pdf  
\textsuperscript{2} https://www.indiacode.nic.in/bitstream/123456789/6809/1/official_language_act.pdf  
\textsuperscript{3} https://en.wikipedia.org/wiki/Goykanadi#cite_ref-onqui_7-0  
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Since Goyakanadi was never used in a printed format, it gradually fell into disuse and was a forgotten script.

Goyakanadi has not been formally standardised in the past as the missionaries chose to use the Latin script or Devanagari script instead. The glyphs referred to in this document are based on: hand written samples found largely on paper manuscripts and the works of some scholars who have studied this script closely. The Goyakanadi samples studied are largely from libraries and private collections found in the states of Goa and Karnataka.

Any genetic relationship between Goyakanadi script and other scripts is superficial. A cursory glance at Goyakanadi will reveal its similarities with Kannada script but the glyphs, Diacritics and Conjunct consonants are significantly different.

Some historians have opined that Goyakanadi was a specialised variant of the Ḥāḷagannaḍa Alphabet, developed as a contact variant between Nāgari and Ḥāḷagannaḍa Alphabet. Whatever the origin might have been Goyakanadi is definitely a descendant of the Kadamba Alphabet belonging to the Southern Brahmi scripts.

Many Konkani manuscripts which are now found in museums in Portugal are Latin transliterations of Goyakanadi manuscripts of Hindu epics. The earliest

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document written in this script is found in a petition addressed by Ravala Seti, of Caraim in the islands of Goa to the King of Portugal. It carries his signature ‘Ravala Seti Baraha’ which means ‘writings of Ravala Seti’ in Konkani Language.

3. Writing system

3.1 Structure
Goyakanadi is an Abugida (Alphasyllabary). It is written left-to-right.

3.2 Character Repertoire
A stable character set for Goyakanadi will be determined once additional information is obtained. The available script chart suggest a repertoire of 109 characters which consists of 6 Vowels, 30 Basic Consonants, 54 Conjunct consonants, 7 Diacritic vowel signs, 9 numbers, 2 punctuation marks and 1 space filler sign. Character names are based on those given in Script charts.

3.3 Considerations for Encoding
Goyakanadi should be encoded as a separate script for the purpose of encoding as there might be need to represent it in plain text independently. Given that there are several records written in Goyakanadi and identity of a community at stake it may be looked at as a separate script and encoded separately to use for plain text purposes.
3.4 The Issue of Representing Goyakanadi in Unicode

The primary issue facing the representation of Goyakanadi in UCS is its close affinity to the Kannada script and Cursive varieties of Kannada script (Kannada moḍī).

Goyakanadi has a lot of similar or identical forms to those already encoded for Kannada. However the two scripts differ in character repertoires, orthographic features, conjunct behaviours and rendering behaviours. Although Goykannadi and Kannada possess corresponding characters, unification of the two suggests that they are one and the same script. The Goyakanadi script was never at any point associated with the Kannada language, nor has the script ever been used for Kannada.

The correspondences between Goyakanadi and Kannada are much less than between Telugu and Kannada. Due to difference of top line between Kannada and Telugu (KANNADA LETTER DA ದ (U+0CA6) and TELUGU LETTER DA ద (U+0C26))

[ GOYAKANADI LETTER DA - This glyph has a distinctive top line different from both Kannada and Telugu ]

and a variety of other minor differences Telugu was allocated a separate block. A similar consideration can be done with Goyakanadi by allocating a separate block for Goyakanadi script.
3.4.1 Brief Assessment of the Models for Representing Goyakanadi-

There are two alternatives to allocating a separate block for Goykannadi-

a) Representing Goyakanadi as an extension of Kannada script-Managing Goyakanadi as an extension to Kannada will entail not only the addition of a large number of characters to an existing script, but also require the development of new rendering rules for an already complex script.

b) Complete Unification of Goyakanadi with Kannada script-Complete unification mandates that the representation and display of Goyakanadi be bound to font control, i.e. Goyakanadi glyphs will be designed and assigned to the code points of corresponding Kannada characters in Kannada fonts. Thus, when users create or view Goyakanadi content, the text will be represented in Kannada script; the user must choose a Kannada font designed to accommodate Goyakanadi glyph in order to display Goyakanadi properly. Complete unification of Goyakanadi with Kannada does not provide a means for representing the script in plain text.

3.5 Comparison of Goyakanadi with Kannada script

An analysis of the Goyakanadi character repertoire indicates that it has several characters that are identical to Kannada, but it also has several character that are distinct from analogues in Kannada.
Most of the Goyakanadi vowels are similar to their Kannada Counterparts. There are only a few minor glyph variations and design changes between Goyakanadi vowels and Kannada script vowels. Here is a chart of Goyakanadi vowels-

अ आ इ उ ए ऐ ओ औ अं अः

Here are some consonant glyphs which are similar or identical with Kannada script-

<table>
<thead>
<tr>
<th>Goyakanadi</th>
<th>Kannada</th>
<th>Transliteration</th>
</tr>
</thead>
<tbody>
<tr>
<td>ದ</td>
<td>DA</td>
<td></td>
</tr>
<tr>
<td>ಧ</td>
<td>DHA</td>
<td></td>
</tr>
<tr>
<td>ಝ</td>
<td>JHA</td>
<td></td>
</tr>
<tr>
<td>ಖ</td>
<td>KHA</td>
<td></td>
</tr>
<tr>
<td>ಕ</td>
<td>KA</td>
<td></td>
</tr>
</tbody>
</table>
Here are some consonant glyphs which are different compared to Kannada script -

<table>
<thead>
<tr>
<th>Goyakanadi</th>
<th>Kannada</th>
<th>Transliteration</th>
</tr>
</thead>
<tbody>
<tr>
<td>ಡ</td>
<td>ಡ</td>
<td>DDA</td>
</tr>
<tr>
<td>ಠ</td>
<td>ಠ</td>
<td>TTHA</td>
</tr>
<tr>
<td>ಟ</td>
<td>ಟ</td>
<td>TTA</td>
</tr>
<tr>
<td>ಯ</td>
<td>ಯ</td>
<td>BA</td>
</tr>
<tr>
<td>ಮ</td>
<td>ಮ</td>
<td>YA</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Goyakanadi</th>
<th>Kannada</th>
</tr>
</thead>
<tbody>
<tr>
<td>ಬ್ಹ</td>
<td>ಬ್ಹ</td>
</tr>
<tr>
<td>ಚ</td>
<td>ಚ</td>
</tr>
<tr>
<td>ಜ</td>
<td>ಜ</td>
</tr>
<tr>
<td>ಥ</td>
<td>ಥ</td>
</tr>
<tr>
<td>ತ</td>
<td>ತ</td>
</tr>
</tbody>
</table>

Most of the Goyakanadi Conjunct consonants are ligatures as opposed to kannada where they are Below-base forms. Some Conjuncts in Goyakanadi follow the Below-base form but by and large conjuncts are ligatures.

Here are some examples of Conjunct consonants in Goyakanadi and their comparison with their Kannada counterparts:

<table>
<thead>
<tr>
<th>Goyakanadi</th>
<th>Kannada</th>
</tr>
</thead>
<tbody>
<tr>
<td>ಸ್ಪ್ರ</td>
<td>ಸ್ಪ್ರ</td>
</tr>
<tr>
<td>ಜೈ</td>
<td>ಜೈ</td>
</tr>
<tr>
<td>ಸಕ</td>
<td>ಸಕ</td>
</tr>
<tr>
<td>ನ್ಯಾ</td>
<td>ನ್ಯಾ</td>
</tr>
</tbody>
</table>
The diacritics in Goyakanadi are remarkably different compared to kannada script. The diacritics in Goyakanadi are ligatures and some glyphs have contextual forms with respect to certain diacritics.
Preliminary design of the above diacritic mark (Vowel sign E)-

Presence of a gemination symbol in Goyakanadi
The gemination symbol is very distinct among the southern Brahmi scripts. This gemination is not found in both the allied Kannada and Telugu scripts. This symbol of
Goyakanadi has been attested in many documents written in the script. This symbol is circular in shape with a dot in the centre usually written below the Consonants.

Above is an attestation of the gemination symbol in Goyakanadi.

These are enough evidences to assign a separate block for Goyakanadi in order to encode it effectively and enable representation of the script in plain text.
4. References

• Gajanana Ghantkar, History of Goa through the Gõykanadi script, Rajahauns Vitaran 1993 [original: University of Michigan]
• Flos Santorum, Padre Frey Amador & Padre S. Francisco Goa, 1607.
Acknowledgements

Endangered archives programme, British library

Gallica French manuscript collection

P. S. Kavthankar

Prahlad Tantry

Vaishnavi Murthy

Anshuman Pandey
Figures

Fig. 1: Goyakanadi Alphabet Chart, by Gajanana Ghantkar
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Fig. 2 : Folio from the Manuscript 'Flos Santorum' of 1607
Fig. 3: Grant of the Village Community of Maem (Near Bicholim in North Goa) in the year 1590.
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Fig. 4: Goyakanadi Folio from the 17th century from the Pandurang Pissurlencar collection donated to the Goa University
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Fig. 5 (Top): Elementary design of Goyakanadi Glyphs

Fig. 6 (Left): Elementary design for Goyakanadi diacritics
Fig. 7: Comparison between Cursive Kannada writing (Moḍī baraha) [Top] and Goyakanadi [Bottom] - The glyphs of Goyakanadi are more clearer than the cursive Kannada writing. Hence the style of Cursive Kannada and Goyakanadi are different.
Fig. 8: Goyakanadi character Anatomy
Fig. 9 : Village Resolution of Goalim-Moula of the Year 1571
Fig. 10: Village resolution of Carambolim of the year 1610
Fig. 11: Household Accounts written in the Goyakanadi Alphabet from Goa (17th - 18th century)
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Fig. 12: Transliteration of a piece of Goyakanadi writing into Kannada script, Devanagari and ISO 15919


Fig. 12: Transliteration of a piece of Goyakanadi writing into Kannada script, Devanagari and ISO 15919
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<thead>
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<th>Kannada</th>
<th>Telugu</th>
<th>Transliteration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ಅಸಿಲೆ</td>
<td>అసిలె</td>
<td>āsilē</td>
</tr>
<tr>
<td></td>
<td>ಜಿರ್ಲಾದಾ</td>
<td>జಿర್ಲಾದ</td>
<td>jirlādā</td>
</tr>
<tr>
<td></td>
<td>ಬ್ರಾಗಾಚಾರ್ಯಾ</td>
<td>బ್రಾಗಾಚಾర</td>
<td>brāgācyā</td>
</tr>
</tbody>
</table>

<table>
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<th>Telugu</th>
<th>Transliteration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>ಬಹುತು</td>
<td>bahutu</td>
</tr>
<tr>
<td></td>
<td>ಅಬಾರ</td>
<td>ಅಬಾರ</td>
<td>ābār</td>
</tr>
<tr>
<td></td>
<td>ಪುಸ್ಯು</td>
<td>ಪುಸ್ಯು</td>
<td>pusyu</td>
</tr>
</tbody>
</table>

Fig. 13: Transliteration of a few Goyakanadi words into Kannada script, Devanagari and ISO 15919
Fig. 14: Transliteration of a piece of Goyakanadi writing into Kannada script, Devanagari and ISO 15919